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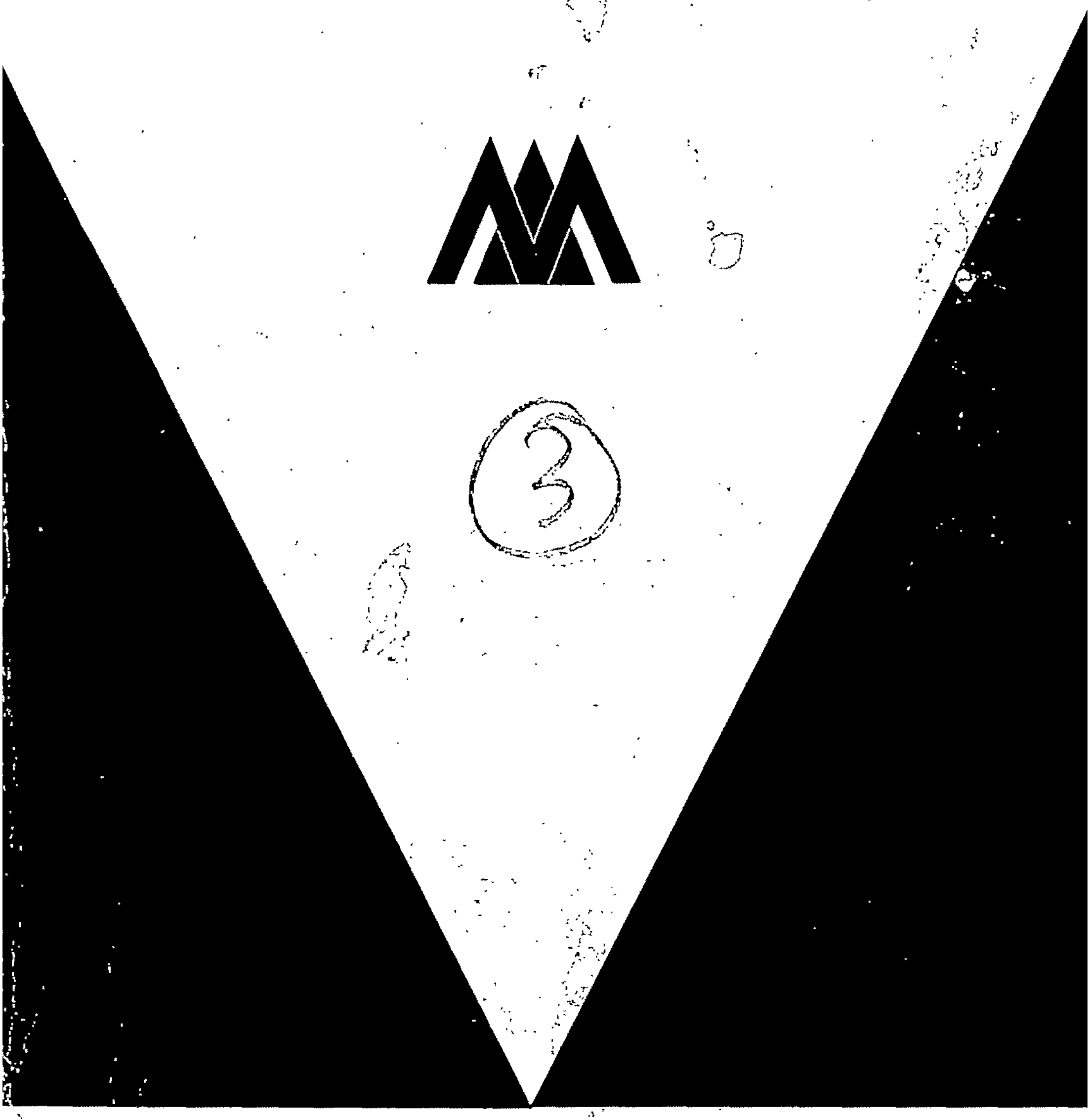

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increasingly feasible. Task specialization by definition breaks tasks into more simple components thereby increasing routineness.

The argument specifying the effects of routineness on the average first line span is based on the exigencies of organizational design. As routineness decreases, persons are expected to seek more information from peers and the superior. Evaluation, training, and control all take more supervisory time; thus management builds in smaller first line spans to insure the quality of supervision. Because the major concern at the first line is to have tasks done in an organizationally approved fashion, there are more supervisors when tasks are less routine.

The number of different first line specialties depresses the average size of first line spans because specialists demand supervision from someone in the same field. If the size of the first line is constant, when there are more specialties there will be fewer persons to group in each category. Hence, the negative effect of specialties on spans will be increased when the effects of size are controlled. Finally, the size of the first line will have some effect on first line spans because grouping people under the same set of supervisors allows these supervisors to be used more economically. When

TABLE 1

Summary of Predictions by Level and Their Theoretical Rationales

A. *The Size of the Level Supervised→Spans*
   1. First line spans: weak, positive; some economy of supervision but spans here are determined primarily by specialty pressure or technology. Therefore, effects of size decline when routineness or specialties are controlled.
   2. Middle level spans: moderate, positive; communications efficiency and control loss criteria argue against adding levels and so spans increase with size. Large spans are manageable because of greater socialization of those supervised relative to that of lower levels.
   3. Executive level span: tautological; the span is the size of the level supervised.

B. *The Size of the Level Supervised→The Number of Specialties at the Same Level*
   1. First line: independent, the number of specialties required is determined by technological considerations.
   2. Middle levels: moderate, positive; greater size here implies even greater size at lower levels, which makes administrative person specialization economically feasible.

C. *The Size of the Level Supervised→Perceived Routineness at the Level Supervised*
   1. First line: positive, moderate; with greater size similar functions can be grouped, possibility of task specialization increases.
   2. Middle levels: negative, moderate; larger size implies increasingly complex tasks of coordination, integration, and control.

D. *The Number of Specialties at the Level Supervised→Spans*
   1. First line and middle levels: moderate, negative; specialties demand their own kind of supervisor, both relationships are stronger if size is controlled.
   2. Executive level: strong, positive; all specialties press for representation in highest level span.

E. *The Number of Specialties at the Level Supervised→Perceived Routineness at the Level Supervised*
   1. All levels: negative; specialties suggest change at all levels and complicate tasks of coordination and control especially at upper levels.

F. *The Perceived Routineness of the Level Supervised→Spans*
   1. First line: positive, strong; spans are designed to insure supervisory control of subordinates' information processing and so complex tasks require smaller spans. If this results in additional levels of lower level supervisors, there is some risk of vertical control loss, but this is unimportant because only small sections of the organization are affected.
   2. Middle and upper levels: independent or weak, negative; because those supervised are more socialized, control of subordinates' information processing by superiors is less of a consideration and spans can be quite large. Small spans that necessitate extra levels of supervision are resisted because ensuing control loss affects major areas of the organization.

specialty pressure and task routineness are controlled, however, the effect of size should decrease. This is because specialties can demand what management would see as uneconomic utilization of supervisors and because nonroutine tasks decrease the number of persons it takes to utilize a supervisor fully. These relationships at the first line are summarized in Table 1.

The Chief Executive's Span

The number of specialties reduces spans at lower levels, but the effect is the opposite at the executive level. It is assumed that specialties exert pressure to be included in high level decision making affecting the distribution of key resources. When many specialties are present, the executive span increases, especially if the organization is designed so that heads of functional units report directly to the chief executive. Even in project or matrix designs, a variety of strategies is possible to increase the representation of specialized groups such as special staff positions or advisors. The chief executive's span, however, has limits. If every specialty in a large and complex organization is represented, representation itself becomes meaningless because the group is too large for effective decision making. Furthermore, very large spans tax the ability of the executive to coordinate internal diversity while maintaining institutional responsibilities. When this span is overtaxed, strategies such as assistant executive directors or divisional designs are used to decrease it. The cost of these designs is a lengthening of lines of communications and the consequent risk of inefficiencies in vertical communications and control loss (Williamson, 1971). Such risks are great precisely under the conditions that lead to their use, i.e., a wide variety of different types of activities requiring different specialties. When the risk that specialty activities will go uncoordinated is perceived as greater than that of control loss, specialty pressure for representation is resisted and increasing numbers of specialties lead to small increases in the executive span or to an actual decline in it. The direction of this curve is difficult to specify theoretically and should probably be left for empirical resolution. One could argue that despite divisional structures, the executive span increases slowly because at least some of the specialties still find ways to be represented in it; the span includes more persons than division heads. Here specialty pressure prevails over management design. Mixed divisional functional designs are common, and specialty pressure for representation may be one of the reasons. On the other hand, management's intended design may counteract specialty pressure for representation, and functional areas then report to division or product managers. If so, an increase in the number of specialties would lead to no change in the chief executive's span. The key question is, since additional upper levels may lead to control loss, under what conditions can specialty pressures be resisted? It is suggested that this could occur in very large organizations in which administrative specialization may be able to provide sufficient control (for example, budget systems or standardized evaluation devices) that the risk of inefficient communications and control loss is minimized and additional levels are possible.

The number of specialties present at lower levels was assumed to decrease the routineness at these levels. At upper levels the same relationships are expected. If there is a large number of specialties throughout the organization, the persons in these spans must interface and coordinate their work with others who represent different methodologies, technical languages, interests, and objectives. Consequently, either organization-wide or level specific person specialization should decrease routineness at the level reporting to the chief executive. Finally, because the desirability of maintaining vertical communications efficiency and of preventing control loss argues against the addition of levels, the executive span remains large regardless of the routineness of work. At the highest level of the organization there is only one span, that of the chief executive. Here the size of the level supervised is the executive's span and the number of superiors is one—the executive. Because of this identity, the size of the level supervised is omitted as an independent variable in predictions of this span. These relationships are summarized in Table 1.

Department Heads' Spans

If the first line specialties have superivosrs of their own kind, the level supervised by department heads will contain many different kinds of specialty supervisors. They too press for supervision from similarly specialized superiors. Consequently, the number of specialties supervised should depress the average span of department heads. Besides specialty pressure there are management design reasons why the number of specialties decreases these middle level spans. For example, departments organized by specialized groups permit special ecological arrangements and better resource allocation. Such trends multiply the number of departments, a condition typical of many professional or person specialized organizations. If the number of specialties is large relative to the size of the level supervised, middle level spans will be smaller. Hence, if the effects of size are controlled, the negative effect of the number of specialized roles on middle level spans should be increased. This is in sharp contrast to the positive effect of specialization at the highest level, the last step in the hierarchy where distinct functions can be integrated.

The exigencies of management design at middle levels are difficult to predict; factors that determine whether additional personnel are to be added in more levels or in larger spans are shifting from those described at higher levels to what they are at lower levels. Still, it is predicted that the effects of routineness on spans of the level supervised will be negative and therefore closer to those effects predicted at higher levels. This is because the need to control subordinates' information processing is not usually a sufficient reason to initiate either of the structural changes that would decrease these spans. The first, creation of additional department heads, complicates interunit coordination. The second change would entail an additional level and permit some supervisors to report to other supervisors, thereby shrinking department head spans. This would probably be avoided because of the risk of vertical communications inefficiency and control loss. At the middle level, however, such a change—the addition of a level—cannot be ruled out entirely because these risks are less than at the higher levels; thus there may be a weak negative effect of routineness on spans. Some of the effect of routineness at this level is due to specialization. As the number of different supervisory specialties increases, there should be some decrease in routineness because the task of management is becoming more complex. Consequently, there will be a small negative association between routineness and department head spans. This association will decline when the number of specialties is controlled. In similar fashion, as the size of the level grows, routineness at these levels will decrease again because of the increased complexity of coordinating and integrating tasks. Therefore, there will be a positive association of routineness with spans because size does lead to larger spans here; however, controls for size should eliminate this association.

Finally, the size of the supervisory level should permit and even necessitate the economic use of a large number of different kinds of specialties, although many may be staff and administrators. In contrast to its lack of effect at lower levels, the size of the level supervised should have a positive effect on spans of department heads. Whole new departments are rarely created to alleviate pressures of too many supervisors reporting to one department head. New levels are also avoided because of the risks to vertical communications efficiencies and control loss. The more probable strategy is the one used at the executive level when the span grows large. An effort is made to utilize supervisors who themselves need less supervision. Because of the resulting greater elasticity of these spans relative to those at lower levels, it is anticipated that the size of the level supervised will have much greater effect than at the first line. These relationships are summarized in Table 1.

METHOD

The Set of Organization

The study utilizes data collected in 1970 by Aiken and Hage in the third wave of their longitudinal panel study of 16 social service organizations. These included three public and three private social casework agencies, the administrative unit of a school system's special education division, three private sheltered workshops, two public and one private mental hospitals, and three private residential child care agencies. These social service organizations with semiprofessionalized staffs are more similar to Blau and Schoenherr's (1971) public employment agencies than to the industrial organizations studied by the Aston group and Woodward (1965) or the retail organizations studied by Ouchi and Dowling (1974). Because of these dissimilarities, some of the relationships discussed may be modified. In social services, the ratio of specialties to size is greater than in an industrial context. This means that the effect of the number of specialties may be greater because there is potential for greater variance in this measure.

The major difference between this set of organizations and those studied by other authors is their size. All employ less than 1,000 persons; their mean size is 188 (SD = 236). This is an advantage because most of these organizations have between three and five levels allowing greater comparability of level specific predictions across organizations. As size increases, additional specialties can be employed economically because of the increasing volume of administrative activities (Pugh et al., 1968). These specialists relieve line personnel of administrative duties, thereby permitting larger spans. This phenomenon should increase the effect of size on spans since, as administrators perform more supervisory duties, each supervisor can control more persons. In the organizations in the present study there is very little administrative specialization because of their small size. Consequently, the effect of size on spans may be less than that found by researchers such as Blau and Schoenherr (1971) or the Aston group whose samples included much larger organizations. Furthermore, the absence of administrative specialization and lack of extreme diversity in these organizations lead one to predict a positive linear relationship between specialties and the executive span.

Organizational Levels

The measures used assess characteristics of a specific level. Because personnel are positioned by levels in the authority structure, an individual's level might be operationalized in simple numeric fashion by counting the number of persons between him and the chief executive. Scores of the same numeric level, however, are not comparable across organizations. The third level in one may be composed of department heads and in another, supervisors. In the present study, levels are operationalized in nominal fashion and thereby are more comparable across organizations. The executive level is the chief executive officer. Department heads are in charge of production, service, or geographically distinct distribution units—whichever form of differentiation occurs first under the chief executive. Division heads coordinate the activities of several such units. Supervisors report to department heads or to other supervisors. Workers, the first line, supervise no other personnel and report to department heads or to supervisors. If a majority of a department head's subordinates are workers, this span is used in the calculations of the first line span. It is noted that this procedure is valid only in organizations of roughly similar size. For example, those in the present study have less than 1,000 employees. If size ranges are large, then there may be so many levels of supervisors and department heads in some organizations that even the comparability of these terms breaks down and another set of categories would have to be developed.

Scores of a given level on any variable are calculated from the responses of all occupants of that level. Three of the organizations studied have measures available from only three levels. In one, the original researchers did not interview persons who did not reside at the central office. Because persons at the central office were all supervisory personnel, this procedure omitted the entire first line. Consequently, this organization thus was omitted when the model of first line spans was tested, bringing the number of cases to 15. In two small organizations, department heads directly supervised the first line. For these organizations department heads were used for characteristics of the level reporting to the executive, but their spans were first line. In these two organizations, no attempt was made to predict the spans of department heads, so the number of cases for this analysis was 14.

Operationalization of the Variables

There are two common operationalizations of the span of control. The first, used by Simon (1945) and Blau and Schoenherr (1971), defines span as the ratio of subordinates to supervisors. Here span is a structural variable describing an arrangement of subordinates to superiors. The second operationalization suggested by Ouchi and Dowling (1974) adjusts this ratio for the proportion of time superiors actually devote to supervision. Although the operationalization of spans as a simple ratio can be used to test the impact of specialty pressures, the adjusted ratio is more appropriate to test for the impact of rational design exigencies. This is because the design argument centers on providing appropriate amounts of superior-subordinate interaction (coordination, discipline, exchange of task information, evaluation, etc.) to insure desired performance. Unfortunately, as the data provide no information concerning the extent of this interaction, the study is limited to the first operationalization.

The span of a level is simply the average of the spans of all superiors at that nominal level. Under an assumption of unity of command, most organizations arrange their personnel so that they have one superior. In some organizations studied, however, other forms of arranging personnel prevailed. Unfortunately, executives were not asked what plan they used when they drew up or tore up their organizational charts, but respondents made it clear that unity of command was not always their concern. Each person was asked to list those personnel who reported to him and to whom he reported. Although it was not frequent, the results at times indicated that two supervisors supervised the same person, that some persons were supervised by no one, and that some persons even supervised their supervisors! A system of decision rules was used to introduce some order into these kinds of chaotic patterns (available upon request from the first author).

All variables were measured for each level. Size is the number of full-time personnel and half the number of part-time personnel. The number of different specialties operationalizes the diversity of participants' knowledge and skills that are applied to the task. Dewar and Hage (1978) give a detailed discussion of this point. Routineness represents respondents' impressions of the lack of variety in their work. The scales are reported in Hage and Aiken (1969). At the organizational level of analysis ($N = 16$), Cronbach's alpha was .90 for the routineness scale, and the reliabilities for the level scores departed from this by no more than .05.

Definitional Dependency of Independent and Dependent Variables

It is intuitively appealing to predict the span of a level from the size of the level reporting to it. However, Freeman and Kronenfeld (1973) claim that there are mathematical problems when one correlates two variables that are not functionally independent. The correlation is spurious and negative because it contains the correlation of size with its inverse (if size is the denominator of the span ratio). This dependence inhibits rejection of the null hypothesis. Freeman and Kronenfeld suggest the alternative of regressing the number of supervisors on the size of the level reporting. A positive intercept indicates supervisory savings, and a negative one implies the reverse, i.e., that supervisors are increasing disproportionately to size. The regression coefficient for size simply indicates the amount of disproportionality.

In the multivariate case, the coefficients for routineness and specialization indicate their effects on the number of supervisors with the effects of size controlled. These coefficients give information theoretically equivalent to that given by the coefficients when the span ratio is the dependent variable but without the disadvantage of spuriousness inherent in the latter due to possible correlations of size with these other independent variables. One must note, of course, that if a variable was predicted to increase spans, this implies a negative effect on the number of superiors if size is controlled. The value of the intercept in the multivariate case cannot be interpreted as indicating the proportionality of the relationship between size and the number of supervisors. In order to explore these effects, the bivariate model was used. The disadvantage of using these two models is that one cannot simultaneously test for the effects of all three independent variables on spans. The only way around this would have been to divide all terms of the equation by the size of the level supervised (Freeman & Hannon, 1975), but this would have led to extreme multicolinearity. Still, it is felt that these procedures are better than a prediction of the simple span ratio because one cannot estimate the spuriousness of the coefficient of size or of any of the other independent variables that may be correlated with size.

Freeman and Kronenfeld (1973) point out a number of cautions in the use of their technique, such as susceptibility of the intercept to outlier influence, the necessity to assume a recursive model (which was done here), the possibility of curvilinear relationships, and skewed distributions. Log transformations were used in the present study to correct for skewed distributions and curvilinear trends. This did not alter any of the findings appreciably, so they are not reported. Scatter plots of all relationships were examined, and outliers were not a problem. Freeman and Kronenfeld also note that measurement error in the span ratio, occurring because some supervisors perform supervisory duties on a part-time basis, will cause the intercept to be close to or less than zero. Because in the present study the span ratios cannot be adjusted for the time superiors actually spend supervising, this measurement error prevents a fully adequate test of a design model of spans with Freeman and Kronenfeld's model. The use of the span ratio, however, would have been susceptible to the same problem of measurement error.

Analysis

The data are presented in path analytic format. This assumes the models specified are recursive systems. The authors are comfortable with the assumption that the number of different specialties and size determine spans, not vice versa. One of the weakest reasons for adding or subtracting specialties or personnel would be that spans are under- or overutilized. It also is assumed that size and the number of specialties influence routineness, not vice versa. Here, however, one might argue that high levels of nonroutineness prompt the hiring of additional specialties to reduce task variability. Also, it is assumed that routineness affects spans, but others might argue that routineness is a consequence of task information in appropriately designed spans. It is assumed that variation in the task leads directly to perceptions of this variation and that spans are increased or decreased as a result of this variation; thus sufficient information can be passed among supervisors and subordinates to handle the resulting uncertainty (Blau, Hydebrand, & Stauffer, 1966). Correlation matrices are available on request from the first author so that those who disagree can test other models.

The regression equations on which the models are based are shown in Table 2. Some of the equations utilize three independent variables. The number of cases is 14, 15, or 16 depending on the level examined. In using statistics for purposes of estimation, this small N produces unreliable regression coefficients. Because this set of cases represents a small population and not a sample, no estimate of the actual coefficients is made. Dewar and Hage (1978) have argued previously that tests of significance are inappropriate with this set of organizations because they were not randomly selected but are a population of social service agencies. When the number of cases is small, however, correlation coefficients can be unstable, and significance tests give some indication of their stability. They are one-tail because the direction of effects has been specified.

TABLE 2
Regression Equations

Dependent Variables	*Independent Variables*	*Regression Coefficient*	*Standardized Regression Coefficient*	*Multiple Correlation Coefficient (adjusted)*	*Intercept*
First Line Relationships (N = 15)					
1. Number of first line supervisors	Size of the first line	.20	.85***	.70***	2.11
2. Routineness at the first line	Size of the first line	.36	.46*	.09	3.19***
	Number of different specialties at the first line	–.44	–.11		
3. Number of first line supervisors	Size of the first line	.22	.93***	.80***	–18.75
	Number of different specialties at the first line	.38	.31**		
	Routineness at the first line	–5.24	–.17		
Executive Level Relationships (N = 16)					
1. Size of the level reporting	The number of different specialties in the entire organization	.26	.76***	.56***	2.60
	Routineness of the level reporting	–.43	–.04		
2. Size of the level reporting	The number of different specialties reporting	.86	.87***	.77***	.94
	Routineness of the level reporting	–.57	–.06		
Department Head Relationships (N = 14)					
1. Number of department heads	Size of level reporting	.72	.56**	.25**	3.75***
2. Routineness of the level reporting	Size of level reporting	–.59	–.42*	.01	3.01***
	The number of different specialties reporting	.15	.33		
3. Number of department heads	Size of level reporting	.13	.11	.46**	–.90
	Number of different specialties reporting	.29	.69**		
	Routineness of level reporting	1.25	.14		

*$p \leq .1$
**$p \leq .05$
***$p \leq .01$

With such a small number of cases the amount of variance explained is likely to be inflated. To give a more accurate picture of the unexplained variance in the path models, the multiple regression coefficients were adjusted:

$$R^2 \text{ (adjusted)} = \frac{\dfrac{[1-(1-R^2)]}{N\text{ (cases)} - K\text{ (variables)}}}{N\text{ (cases)} - 1}$$

FINDINGS

First Line Spans

The results in Figure 1 provide support for most of the predictions at the first line (see Table 1). There is no association between size and the number of specialties at the first line. Also, as predicted, size was not found to have an effect on the first line span because there was no significant difference between the intercept and zero. (Even though the regression coefficient for size is large, this shows only the rate at which supervisors are added, not the extent of supervisory savings which is indicated by a positive difference between the intercept and zero.) The argument that the intercept may have been reduced because some supervisors performed supervisory tasks on a part-time basis (Freeman & Kronenfeld, 1973) is plausible. In a semiprofessionalized context such as this, supervisors would be expected to have some client contact.

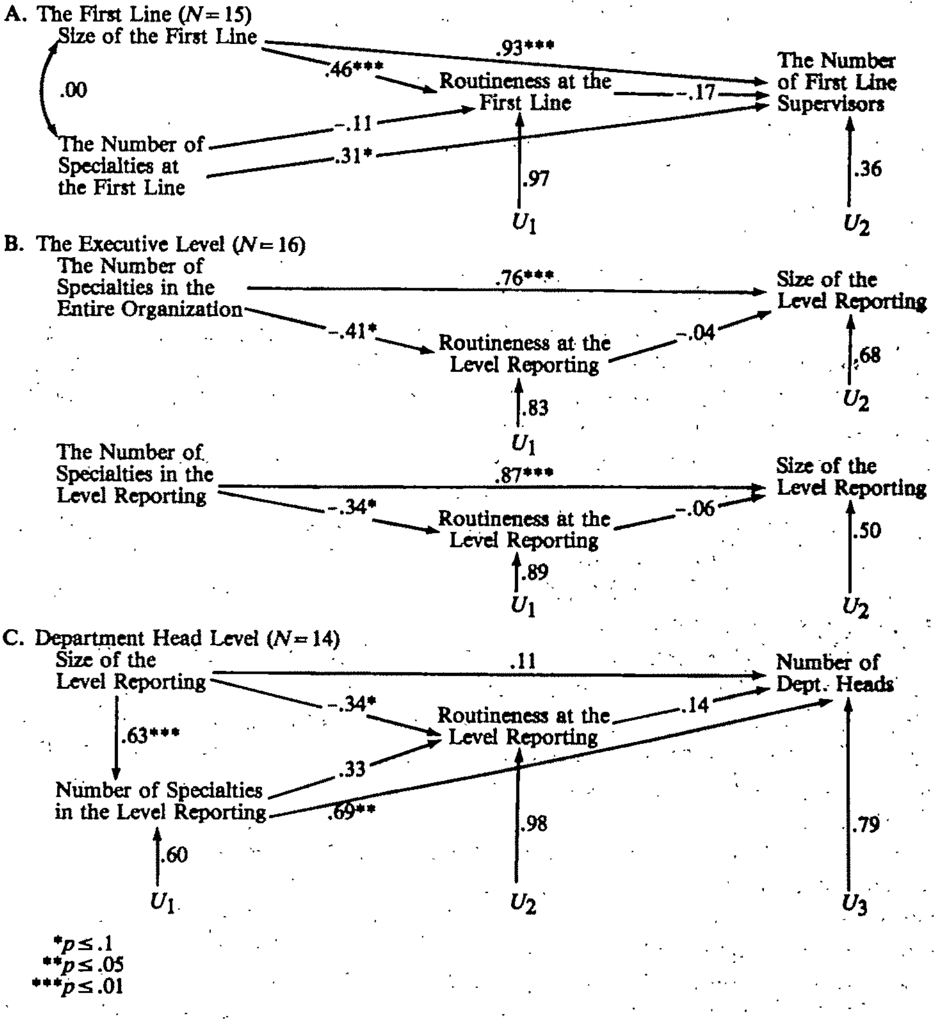
The size of the first line does lead to more routineness. This probably reflects some task specialization even in this semiprofessionalized context. The small negative path between the number of specialties and routineness implies little of the predicted reduction of routineness by specialties, either as they impede the process of simplifying tasks or when they make suggestions for change.

The number of specialties reporting has a moderate and positive effect on the number of first line supervisors. This is consistent with the argument that specialties have the power to demand similarly specialized superiors. Routineness, however, has little effect and so it cannot be concluded that spans at lower levels are designed to control subordinates' information processing. The other finding inconsistent with prior argument is the lack of change in the relationship between specialties and the number of supervisors when size is controlled. An increase had been expected because at any given level of size the more specialties there are, the smaller the spans should be. The zero order correlation ($r = .33$) is hardly different from the path coefficient.

If measures were available of the proportion of time supervisors allocate to supervision as opposed to client treatment, a better test could be made as to whether size leads to any supervisory savings or whether nonroutineness leads to fewer supervisors. It can be said, however, that there is no

FIGURE 1

Path Models Illustrating the Effects of the Size of the Level Reporting, the Number of Specialties Reporting, and Perceived Routineness of the Level Reporting on the Number of Supervisors


A. The First Line ($N = 15$)
Size of the First Line
.00
The Number of Specialties at the First Line
.93***
.46***
Routineness at the First Line
-.11
.31*
-.17
The Number of First Line Supervisors
.97
U_1
.36
U_2
B. The Executive Level ($N = 16$)
The Number of Specialties in the Entire Organization
.76***
-.41*
Routineness at the Level Reporting
-.04
Size of the Level Reporting
.83
U_1
.68
U_2
The Number of Specialties in the Level Reporting
.87***
-.34*
Routineness at the Level Reporting
-.06
Size of the Level Reporting
.89
U_1
.50
U_2
C. Department Head Level ($N = 14$)
Size of the Level Reporting
.11
-.34*
.63***
Routineness at the Level Reporting
.14
Number of Dept. Heads
.33
Number of Specialties in the Level Reporting
.69**
.60
U_1
.98
U_2
.79
U_3
*$p \leq .1$
**$p \leq .05$
***$p \leq .01$

saving with large size in the simple number of persons who supervise first line workers, even if some may be doing this on a part-time basis.

Executive Spans

The total number of specialties is a very strong predictor of the number reporting to the executive ($r = .87$), so strong that both cannot be used in the same equation because of multicolinearity. Also as predicted, both have similar negative associations with the degree of routineness at this level. The association of the total number of specialties is greater, implying that diversity throughout the organization complicates the task of those reporting to the executive more than does diversity at the level reporting.

Both the number of specialties reporting and the total number of them are strongly associated with the executive's span, whether or not routineness is controlled (Figure 1). Scatter plots of the zero order associations (not shown here) indicate no trends violating homoscedasticity. This is important because it means that when there were few different kinds of specialties in the agency, there were few reporting to the executive. Because the total number of specialties was associated with executive spans, it is unlikely that the relationship between specialties reporting and the executive span reflects a mathematical artifact; in other words, when there is a large number of different specialties reporting to the executive, there is a large number of persons reporting. Instead, when the entire organization becomes complex, the executive span grows large, reflecting a need for top level coordination of this diversity. This association is in sharp contrast to the negative effect on spans of the number of different specialties reporting at the first line (Figure 1). These data are consistent with the contention that the task of coordinating this diversity is pressed on the executive by the power of these specialized groups. Additional higher levels, such as executive assistants which decrease the executive's span, are used only when there is a low degree of person specialization.

These findings must be qualified by again referring to the relatively small size of these agencies. Had they been larger, or more diversified, it is possible that some of them would have developed the administrative specialization sufficient to minimize the control loss and communications risk of adding additional levels of division heads to whom some of these specialties could report. This would have provided a means to counteract specialty pressure for representation in the executive span if such pressure is indeed operative, and may have produced a curvilinear relationship of specialties with this span.

Routineness has little effect on executive spans. This is contrary to the prediction of a weak negative effect. Apparently the primary consideration for executive spans is the resolution of large amounts of differentiation in the occupational structure. Whether or not the work is routine, spans fluctuate with the number of specialties. Persons at this level are sufficiently socialized to carry out their tasks appropriately and, even if they are nonroutine, with little direct supervision.

Department Head Spans

At the department head level, the results (Figure 1) support the predictions of spans from specialties and size. They also indicate that routineness is not predicted well by size and specialties, and that it has no effect on spans at this level.

When routineness is regaressed on size and specialties, the coefficients are only moderate and the adjusted multiple regression coefficient is barely different from zero (Table 2). Apparently there are other important predictors of the degree of routineness of supervisory work. The degree of routineness has almost no impact on the number of department heads. One reason may be that department heads resist the trend to add an assistant to help them directly supervise part of their spans for the same reason that higher levels avoid this strategy: the risk of vertical communications inefficiency and control loss.

Because the intercept was found to be significantly different from zero and positive, there appears to be more economical use of department heads as the number of persons reporting to them increases. Size, then, does lead to larger spans at these middle levels and a consequent saving in the number of superiors required. The coefficient between specialties and the number of department heads remains large regardless of controls for size. This implies that at any given size there is a definite decrease in spans if there are more specialties. This may reflect the ability of the supervisors of each specialized group to report frequently to department heads with the same specialty, even if there are few of these supervisors. Spans of department heads increase only if size increases faster than different specialties are added. If specialties increase faster, spans remain small, even if this level grows very large. Instead of grouping supervisors under department heads with a different specialty, the number of department heads is increased, thereby permitting more specialties access to the executive level. When the number of supervisors in each specialty category grows large, however, department head spans get larger. Assistant department heads, or additional middle levels, are not added probably because of the risk of vertical communications inefficiency and control loss and because specialties already have their own kind of supervision.

DISCUSSION

It was assumed in the beginning that predictors of the span of control differ by level. This argument has been supported for specialties and size although not for routineness. As was shown earlier in Hage and Dewar (1973), and more recently by Bacharach and Aiken (1976), the association between the same variables may vary greatly across levels. Furthermore, these findings lend some support to Parson's (1960) description of level specific differences in functions.

The most important finding is the impact of the number of different specialties on spans. This effect reverses across levels. At the executive level it is strongly positive but at middle and lower levels specialties lead to smaller spans. Two different rationales are compatible with the negative effect. First, relying on the power of their unique and specialized knowledge, these specialties demand and obtain supervision from superiors of their own kind. The second interpretation is that the homogeneous

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supervisor-subordinate groups occurred because the unique needs of their different tasks were recognized and spans designed accordingly. Present data cannot determine which explanation is correct. Still, this question is an important one because its answer bears directly on the effectiveness of person specialized organizations.

Woodward (1959) found that spans were smaller the higher the level, and Fayol (1949) and Newman (1951) argued that this improves higher level decision making. In contrast, in the current study the mean number of subordinates increases the higher the level. The discrepancy might be resolved by considering the recent findings of Pitts (1977). Organizations that grow by internal innovation usually have larger administrative staffs, reflecting a strategy of tighter top level control to insure resource sharing. Organizations that grow instead through the acquisition of highly dissimilar parts need to grant them autonomy because their value is their diversity. Few of the organizations in the current study grew through acquisition, probably because of their high degree of competition with one another (Aiken, Dewar, DiTomaso, Hage, & Zeitz, 1975). Instead, if they grew at all, this occurred through simple increases in the volume of previous activities and in innovative programming (Dewar & Hage, 1978). Because few of them were sufficiently large to afford administrative specialization, chief executives had large spans to insure direct contact with their subordinates to promote resource sharing.

This research was conducted in quasi-professionalized organizations. Thus one may argue that the results concerning the impact of specialties is confined to this context. The main difference between this and say a manufacturing context, however, is the degree, not the kind, of person specialization. Other kinds of organizations have specialized personnel in the sense used here. If there are not many kinds of specialties present, then person specialization will have little effect on spans and other variables will be more important. What is unique about this set of organizations is the potential, not the necessity, for high scores on this dimension.

In contrast to other findings, for example, Blau and Schoenherr (1971), size was found to have little effect at the first line. Its main effect emerges at middle levels. The difference between these results and those typically reported (Van Fleet & Bedeian, 1977) may have occurred because the present authors controlled for the functional dependency of size on the span ratio, permitting a better test of the null hypothesis; at the first line they were unable to reject it. The degree of routineness does not predict spans at any level. This was not expected at the first line. An adjustment of span ratios for the actual time spent in supervision might have improved these results and provided more support for the management design argument. At higher levels, however, the lack of relationship is consistent with the argument that other design constraints overrule the need to change spans simply to provide closer supervision.

Finally, this paper has developed a limited model of spans of control. There are other determinants that have not been examined. Spans may be influenced by tradition, union agreements, or civil service requirements. Individual supervisors may acquire sufficient power to increase or decrease their spans. It is difficult, however, to specify the direction of the effects of such influences. More systematic determinants would include the number of supervisory functions provided by support units. The burden on supervisors is eased and their spans increased as support units train, monitor, schedule, and otherwise control persons, especially those at the first line who, it is assumed, are generally less socialized. A more comprehensive model of spans also would take into account the physical distance of subordinates from each other and from the superior. Performance pressures on the superior may also influence spans. High levels of pressure may decrease the willingness to delegate decisions and thereby decrease the number of persons who can be controlled. Finally, it has been only assumed that output control both becomes more feasible and is used more as one ascends the hierarchy. Although the findings regarding upper level spans are consistent with this interpretation, these assumptions need a more direct test. Specifically, there is a need to determine the role socialization plays in promotion decisions and whether superiors are more likely to rely on output controls the more socialized their subordinates are.

Spans are, of course, only one mechanism of control. The effectiveness of supervisors functioning in them as control agents is influenced by formal supports and informal mechanisms of control such as prior socialization or organizational myths and customs. These alternative mechanisms of control are at times so pervasive—or the only ones subordinates will accept—that the whole concept of reporting to a supervisor is irrelevant. Designs in advanced scientific or professional settings have spans of control that are often nominal, if they are acknowledged at all. The present findings certainly are not intended to be generalized to such settings.

CONCLUSIONS

This paper has demonstrated that the predictors of spans differ by organizational level. Future studies of spans of control should consider this. Unfortunately, this study has not been able to resolve the controversy as to whether size or technology is the primary cause of spans; in this data neither seems to be. Instead, a third determinant, person specialization, seems more important. Nor was it possible to examine several important assumptions such as the importance of vertical communications efficiency and the prevention of control loss. Measures of these would have contributed much to a better test and understanding of the influence on spans of exigencies of management design. Furthermore, measures of the proportion of time superiors spent in supervision, as opposed to production or service activities, and the proportion of time they devoted to each of the different processes of supervision might have provided more support for the arguments regarding the effects of routineness on spans. These measures might be considered in future research. Finally, the findings suggest that in level specific predictions of spans there are more determinants than management's design. The findings are consistent with the assumption that specialties can tailor spans to their own objectives, perhaps even at the expense of organizational economies in the utilization of supervisors.

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A Level Specific Prediction of Spans of Control Examining the Effects of Size, Technology, and Specialization[1]

ROBERT D. DEWAR
Northwestern University
DONALD P. SIMET
The State University of New York at Buffalo

This paper develops and tests a model which states in level specific fashion the effects that size, routineness, and the number of different specialties have on the span of control. The number of specialties supervised was found to decrease spans at lower and middle levels and increase them at upper levels. Routineness had little effect at any level. Size had little effect at lower levels but a positive effect at middle ones.

Structural arrangements in organizations rarely reflect perfectly the management criteria of maximum information processing capacity, minimum waste, and maximum achievement of management goals. Instead, the degree of centralization, formalization, the division of labor, and even horizontal and vertical differentiation often are compromises reflecting the objectives of various interest groups and coalitions. The span of control is no exception. This paper develops a model that explains spans, taking into account the criteria of good design from management's point of view but including other constraints and pressure that may not be consonant with these criteria.

Spans of control are a structural arrangement allocating subordinates to superiors. They, of course, are only one part of the much larger process of control, but their prediction is important both practically and theoretically. On the practical side, if spans are too small, supervisory manpower is used inefficiently and subordinates may be overloaded with supervision. If they are too large, supervisory control may deteriorate because supervisors

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are overloaded with subordinates. Woodward (1965), for example, maintains that there is an optimal average size for first line spans which promotes organizational effectiveness, depending on the type of technology. Theoretically, the prediction of spans provides the opportunity to resolve a controversy in the literature between authors such as Woodward (1965) and Hickson, Pugh, and Pheysey (1969), who claim spans are determined primarily by technological variables, and Blau and Schoenherr (1971), who propose that size is their principal determinant. Finally, and perhaps most importantly with respect to understanding the complex morphology of organizations, a test of a theory of spans permits an exploration of the way in which the process of control is assumed to differ across organizational levels.

A LEVEL SPECIFIC PREDICTION OF THE SPAN OF CONTROL

Theoretical predictions of the span of control can be made for a specific superior's span (Barkdull, 1963; Filley, 1963; Steiglitz, 1962). More recent studies have explored relationships between characteristics of the *entire* organization and spans of superiors at a particular level in the hierarchy (Woodward, 1965; Hickson et al., 1969; Blau & Schoenherr, 1971). The use of characteristics of the entire organization to explain spans of control, however, may easily blur the observation of different effects of the determinants of spans at different hierarchical levels, and there are several reasons to assume these determinants do differ. For example, each level may be considered to have a technology, but Parsons (1960) claims that the higher levels engage in institutional functions, such as relating the organization to the environment, seeking support, strategic decision making, and coordinating the organization's diverse functions. Middle levels implement top level policies by choosing the means to carry them out and monitoring this process. Lower levels perform the operational tasks that translate higher level decisions into products or services. If these functions differ by level, then one may assume that the dynamics and type of control may differ and, further, that the determinants of spans will also differ in their effects across levels.

Three of the many possible determinants of spans have been chosen. They allow the development of a model of spans encompassing the managerial criteria of design and also those elements that constrain their implementation, such as maximization of subgroup goals. The first determinant of spans is the number of people supervised, which is that segment of the organization's size divided among a group of supervisors at a particular level. The second is routineness, a technological variable referring to the extent to which tasks are easily understood (Perrow, 1967). The third is the number of different person specialized roles, what Hage and Aiken (1967) call complexity. This is the number of different kinds of specialized knowledge present in the members of the organization. It is assumed that structural arrangements such as spans are affected more by management design decisions and by constraints that act immediately upon them than by conditions occurring throughout other areas of the social system. Consequently, it is predicted that characteristics of first line technology or the size of the first line will affect the average first line span; supervisory level technology (actually the task of supervision) and the number of supervisors (the "size" of this level) will affect the average span of the superiors of these supervisors, etc.

How then, and why are the effects of these variables expected to differ by level? The effects of routineness differ because it is assumed that the need for supervision of personnel at various levels differs. Persons at higher levels are placed there often because they are more skilled in administration and supervision, but primarily because they are more socialized. Because they are habituated to make decisions in a fashion acceptable to management, they can be trusted to carry out the institutional and managerial functions of these levels with little need for direct supervision. The difference in the distribution of socialized personnel is probably one reason that Ouchi and Maguire (1975) found greater use of behavioral and output control at lower levels, but only output control at higher ones; behavioral control presumes less socialization than the output type (Ouchi, 1977). Here one begins to appreciate the desirability of a level specific prediction of spans of control. If work is nonroutine at lower levels, subordinates need more information. Spans are kept small so that superiors can be the principal information source and also monitor their subordinates' information processing so that it is done in a management approved fashion. At higher levels, routineness still varies, although one would expect work to be somewhat less routine because most of the tasks at these levels are managerial. Here, however, people are more socialized. Although they may need even greater amounts of information to make decisions, their greater level of socialization implies that decisions consistent with management's view will be made even if the superior is not the major information source—socialized peers will do just as well—and that their information processing need not be closely monitored by their superiors. Routineness, then, would be positively associated with spans at lower levels; however, at higher levels the need to control information processing is less, routineness will have less impact, and other variables will determine these spans.

Besides differences by level in the distribution of socialized personnel, there also are differences in performance constraints. The most important ones from a managerial design perspective are vertical communications efficiency (Katz & Kahn, 1966; Galbraith, 1977) and the prevention of control loss (Williamson, 1971). At higher levels, even though the volume of vertical communications may be less because of the output style of control used, those decisions that remain have greater scope and impact. They vitally affect the operations of large proportions of the organization. Lower level decisions affect the decision makers' immediate work group; higher level decisions affect not only middle level subordinates but their subordinates, and so on. If an additional lower level is added—for example, an assistant supervisor—poor quality decisions are risked only in the areas of the new level. If a level is added higher up, decision quality in all areas below this is potentially affected. Consequently, there is a greater risk of adding higher levels than lower ones.

The differential impact on spans at various levels of the need for communications efficiency and the prevention of control loss arises when one considers that a common way to correct spans that have grown too large is to create assistant supervisors to whom part of the spans report. This adds a level that is a feasible option at lower levels but at higher levels is a potential communications block at the nerve center of the organization. To avoid this problem, spans at higher levels are often very large, although one might have predicted them to be smaller had the routineness of the task been a consideration. Consequently, routineness is expected to lead to larger spans at lower levels but to have little effect on spans at higher levels.

As with routineness, the relationships between the number of different specialties, size, and spans also differ by level. The following discussion specifies ways in which these variables are expected to affect one another and develop a multivariate prediction of each level's span.

First Line Span of Control

First line employees have no subordinates. The size of the first line and the number of specialties at the first line are assumed to be exogenously determined by the magnitude of demand for goods and services (Hummon, 1971) and the requirements of the task for specialized forms of knowledge. Size and the number of specialties are not related to each other at the first line. If the task does not require different specializations, there is no reason why size in and of itself should generate more specialties. Size is related to administrative specialization (Pugh, Hickson, Hinings, & Turner, 1968), but this should have no impact at the first line.

The direction of the relationship of specialization with routineness at the first line depends on whether one is speaking of person or task specialization. Task specialization increases as jobs are broken down into more simple components. This form of specialization obviously should have a positive relationship with routineness. The other form of specialization, person specialization, however, is the primary concern here. This increases when there are more different kinds of specialized persons, i.e., people with extensive formal training qualifying them to perform complex tasks. As the number of specialties increases, there presumably are more complex tasks as well as an increase in horizontal communications and in suggestions for change. All three of these factors should contribute to a decline in routineness at the first line.

If size increases and person specialization remains constant, routineness should increase. With increasing size there may be more persons in some of the specialized categories in which case task specialization becomes

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Domains of Organizational Effectiveness in Colleges and Universities[1]

KIM S. CAMERON
University of Wisconsin

Four major domains of organizational effectiveness in colleges and universities are identified—academic, morale, external adaptation, and extracurricular domains—and four types of institutions are found that differ significantly in the domains of effectiveness in which they excel. Among the major institutional characteristics that predict domain effectiveness are type of academic program offered, institutional affluence, and institutional stability.

A variety of approaches to the definition of organizational effectiveness has been taken. These different approaches generally have emerged from different conceptualizations of the meaning of an organization. That is, organizations have been viewed as rational entities in pursuit of goals (Perrow, 1970), as coalitions reacting (or proacting) to strategic constituencies (Pfeffer & Salancik, 1978), as individual need-meeting cooperatives (Cummings, 1977; Keeley, 1978), as meaning-producing systems (Pondy & Mitroff, 1978; Weick, 1978), as information processing systems (Galbraith, 1975), and so on. As the conceptualization of what an organization is changes, so do the definitions and approaches to organizational effectiveness.

Four approaches to defining organizational effectiveness have received particular attention. The most widely used is the *goal model* (including both operative and official goals), which defines effectiveness as the extent to which the organization accomplishes its goals (Etzioni, 1964; Campbell, 1977; Price, 1972; Scott, 1977). One problem with this approach is that an organization may be judged to be effective in areas outside its goal domain. For example, NASA was very effective in the 1960s in producing useful consumer products aside from its primary goal to reach the moon,

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and the Liggett and Myers Tobacco Company became so successful at selling dog food that it was sued in the early 1970s for holding a monopoly. Also, the organization may be ineffective even when accomplishing its goals if the goals are too low, misplaced, or harmful. For example, Boise Cascade set a goal of increasing company earnings by 20 percent each year and met that goal for twelve years. However, in order to do so the firm developed a norm of taking on risky projects that led to their demise and forced reorganization in 1972 (McDonald, 1975).

The second approach to effectiveness, the *system resource model* focuses on the ability of the organization to obtain needed resources. Inputs replace outputs as the primary consideration (Yuchtman & Seashore, 1967). Organizations, however, may prove to be effective even when inputs are not optimal and when a competitive advantage in the resource market place does not exist. For example, the "no name" Seattle Supersonics did not succeed in attracting superstars for their ball team but still reached the NBA championship finals in 1978 and won in 1979. Furthermore, Molnar and Rogers (1976) suggest that in nonprofit organizations the acquisition of inputs is not tied to the production of outputs. Consequently, resource acquisition (inputs) cannot be used as a legitimate criterion of effectiveness.

A third approach is the *process model*, wherein effectiveness is equated with internal organizational health, efficiency, or well-oiled internal processes and procedures. Argyris (1964), Bennis (1966), and Likert (1967) represent points of view that fit under this rubric. Again, however, an organization may be effective even when organizational health is low and internal processes are questionable (e.g., the strife-ridden World Champion New York Yankees in 1977 and 1978 who, despite poor internal health, still won the World Series). In addition, in turbulent external environments, the presence of organizational slack (unused, convertible resources) may indicate inefficiency in internal processes while being essential for long term organization survival and adaptability.

The fourth approach is the *ecological model* (Miles, 1980) or the *participant satisfaction model* (Keeley, 1978). Effectiveness is defined in terms of the degree to which the needs and expectations of strategic constituencies are met by the organization. (Keeley suggests that the minimization of regret is a better way of stating the criterion.) This approach can be viewed either as a summary measure for an organization (e.g., the average or minimal satisfaction levels for all constituencies) or as a series of different scores from a variety of constituencies (e.g., where score variance becomes critical). It mainly emphasizes constituencies outside the organization, and the most effective organization is that which at least minimally satisfies, or reduces the regret of these major strategic constituencies. See Steers (1977).

Organizations may ignore strategic constituencies, however, in seeking effectiveness, and they may achieve success in spite of conflicting or contradictory constituency expectations. This is particularly true in charismatically led organizations. For example, Clark (1970) gives an account of the development of the prestigious "Swarthmore saga" by Frank Aydelotte despite external constituency resistance. The growth and expansion of the newly formed Mormon church in the 1880s despite resistance, persecution, and even an "extermination order" in Missouri is another example.

Each of these approaches has certain advantages as a research and theoretical tool, but each also has weaknesses (Cameron, 1980). Because each of these models is analytically independent, one approach may be appropriate in certain circumstances or with certain types of organizations for which other models are not appropriate. One major consideration in determining which model is most appropriate in assessing effectiveness is the domain of activity in which the organization is operating. For example, the strategic constituencies approach may be most applicable in an organization operating in multiple domains, where outcomes are obscure, or when required to respond to a diverse group of constituency demands. The goal model, on the other hand, is not appropriate in those types of organizational settings but is most appropriate when organizational domains are narrowly defined, goals are consensual, or when outcomes are easily identifiable.

Organizational domains generally refer to the population served, the technology employed, and the services rendered by the organization (Meyer, 1975). These domains may arise from choices made by dominant coalition members concerning what activities are to be emphasized, what the organization already knows how to do, and what evaluation criteria can be agreed upon (Lindblom, 1959; March & Simon, 1958; Thompson, 1967; Weick, 1979), or they may be officially prescribed for an organization by external mandate, such as with government agencies, certain service organizations, or educational institutions. Organizations frequently operate in multiple domains, but few organizations maximize effectiveness in all of their domains. More generally, organizations are effective in a limited number of domains and ineffective in the others (Cyert & March, 1963; Pennings & Goodman, 1977; Steers, 1977). In fact, achieving effectiveness in one domain may mitigate against achieving effectiveness in other domains. For example, a university faculty may unionize in order to enhance individual or subunit resource acquisition (e.g., increasing faculty power, salaries, fringe benefits, grievance resolutions), but at the same time may destroy internal organizational health (e.g., creating adversarial relationships among organizational constituencies, undermining "system 4" characteristics, etc.).

Meyer (1975) points out that organizational domains in the not-for-profit sector are much more vague and ill-defined than in the for-profit sector, and that the performance of not-for-profit organizations in their domains frequently cannot be evaluated. In institutions of higher education, for example, domain dissensus and lack of clarity about primary tasks has been a consistent theme in the literature (Hutchins, 1977). Good evaluations of organizational effectiveness, therefore, have been absent.

This study sets out first to identify empirically the major domains that typify colleges and universities and to assess levels of effectiveness in each of those domains. Second, it attempts to determine the characteristics of institutions that explain the differences in domains of effectiveness among institutions of higher education. No research to date has addressed these topics.

METHOD

Instrument

An instrument reported in Cameron (1978a) was used to identify and assess the major characteristics of colleges and universities that are associated with effectiveness. That is, characteristics and activities of institutions of higher education that were judged by approximately 40 administrators and faculty members to be indicative of effective organizational performance were used as the groundwork for identifying organizational domains. The problem in the past with identifying domains in colleges and universities has been that when asked, administrators and faculty members cannot give useful answers. Gross and Grambsch (1968) found, for example, that when senior faculty members and administrators were asked to rate the importance to their institution of 47 goals in a wide variety of domains, *all* the goals were rated as being important. That is, respondents were unable to differentiate consciously among the importance of a wide variety of domains for their institutions.

The approach taken in this study is to use ratings of the extent to which an institution is typified by certain characteristics of effective institutions that represent a variety of different domains. These ratings then are combined in such a way as to identify the important domains of the institutions and their effectiveness in each domain.

Institutional Sample

Selected for inclusion in the study were 41 colleges and universities in 7 states in the northeast United States. Of the 41 institutions, 44 percent have faculty unions, 56 percent do not; 41 percent are public, 59 percent are private. Institutional age ranges from 12 years (two institutions) to over 200 years (two institutions). Only a bachelor's degree is offered by 17 percent, master's degrees are offered by 53 percent, and Ph.D.s by 29 percent. Size indicators range from just under 1,000 undergraduate students enrolled to just over 11,000; 5 institutions have less than 10 academic departments, and five have over 30. Confidentiality was promised to each institution, hence names of schools are not included in this paper.

Respondent Sample

In each of the 41 institutions, approximately 55 academic department heads and administrators (dominant coalition members) received a questionnaire requesting that they rate the extent to which their institution possessed characteristics judged to be indicative of effectiveness. Items used to measure effectiveness are listed in Table 1.

Of the questionnaires distributed, 61 percent (1,317) were returned. Return rates across institutions ranged from 40 percent to 77 percent, and responses across the 5 job categories (general, academic, financial, and student affairs administrators, and academic department heads) ranged from 55 percent to 69 percent. Respondents included 610 academic department heads and 707 administrators.

Analyses

Data analysis relied on three separate procedures. First, the questionnaire items were examined to determine if separate dimensions of organizational effectiveness could be identified for each institution. Cameron's (1978a) study suggests that nine separate dimensions should emerge from these items, and psychometric tests are needed to determine if those dimensions generalize to this larger sample of institutions.

Second, in order to identify the organizational domains represented by these nine dimensions of effectiveness, institutional scores on the nine dimensions were submitted to a clustering procedure to determine which of the dimensions group together and whether institutions can be identified that clearly excel in a particular domain. A variety of clustering procedures is available (Hartigan, 1975; Johnson, 1967), and since no agreed upon criteria exist for determining which clustering algorithm produces the best results (Hartigan, 1975; Arabie & Boorman, 1973), a clustering algorithm was selected that produces the set of clusters that are most interpretable, or for which statements regarding similarities and differences among the groups can be made. This algorithm, called CONCOR, was introduced by Breiger, Boorman, and Arabie (1975). Whereas applying the criterion of "meaningfulness" of clusters is a subjective endeavor, no objective criteria are available, and meaningfulness of results is the most practical criterion for purposes of this study.

The third part of the analysis focused on explaining the differences among institutions that differ in their domain effectiveness. That is, the task was to identify institutional characteristics possessed by one institutional group that are not possessed by other groups. Discriminant analysis, a statistical technique that weights and linearly combines variables so that groups are forced to be as different as possible on the linear combinations, was applied in order to differentiate the institutional groups based on their effectiveness in the domains. A number of discriminant functions is produced by this procedure (up to the number of groups minus one),

TABLE 1
Items, Dimensions, and Definitions of Organizational Effectiveness in Institutions of Higher Education

Dimension	*Definition*	*Items*	
1. Student educational satisfaction	The degree of satisfaction of students with their educational experiences at the institution.	X_{11}	Manifested student dissatisfaction
		X_{12}	Received student complaints
		X_{13}	Attrition resulting from dissatisfaction
		X_{14}	School spirit displayed
2. Student academic development	The extent of academic attainment, growth, and progress of students at the institution.	X_{21}	Amount of extra work and study by students
		X_{22}	Level of student academic attainment
		X_{23}	Number going on to graduate schools
		X_{24}	Amount of student academic development
		X_{25}	Emphasis on outside academic activities
3. Student career development	The extent of occupational development of students, and the emphasis on career development and the opportunities for career development provided by the institution.	X_{31}	Number of students employed in major field
		X_{32}	Extent to which career goals are met
		X_{33}	Number of career oriented courses
		X_{34}	Number of students obtaining jobs of first choice
		X_{35}	Importance of career education for job attainment
4. Student personal development	Student development in nonacademic, noncareer oriented areas, e.g., socially, emotionally, culturally, and the emphasis on personal development and opportunities provided by the institution for personal development.	X_{41}	Opportunitites for personal development
		X_{42}	Nonacademic growth
		X_{43}	Emphasis on nonacademic activities
		X_{44}	Importance of personal development
5. Faculty and administrator employment satisfaction	Satisfaction of faculty members and administrators with their jobs and employment at the institution.	X_{51}	Faculty preference for this institution over others
		X_{52}	Administrator preference for this institution over others
		X_{53}	Faculty satisfaction with employment
		X_{54}	Administrator satisfaction with employment
		X_{55}	Faculty satisfaction with the school
		X_{56}	Administrator satisfaction with the school
6. Professional development and quality of the faculty	The extent of professional attainment and development of the faculty, and the amount of stimulation toward professional development provided by the institution.	X_{61}	Faculty attendance at professional conferences
		X_{62}	Faculty publications
		X_{63}	Teaching at the "cutting edge"
		X_{64}	Awards received by the faculty
		X_{65}	Amount of professional development

TABLE 1 (cont.)
Items, Dimensions, and Definitions of Organizational Effectiveness in Institutions of Higher Education

Dimension	*Definition*	*Items*	
7. System openness and community interaction	The emphasis placed on interaction with, adaptation to, and service in the external environment.	X71	Community service of employees
		X72	Professional activities outside the college
		X73	Emphasis on community relations
		X74	Community programs sponsored
		X75	Adaptiveness to external environment
8. Ability to acquire resources	The ability of the institution to acquire resources from the external environment, such as good students and faculty, financial support, etc.	X81	National reputations of faculty
		X82	Drawing power for local students
		X83	Drawing power for national students
		X84	Drawing power for faculty
		X85	Drawing power for financial resources
		X86	Ability to acquire resources
9. Organizational health	The benevolence, vitality, and viability in the internal processes and practices at the institution.	X91	Student/faculty relations
		X92	Intergroup relations
		X93	Amount of feedback obtained
		X94	Typical communication type
		X95	Presence of cooperative environment
		X96	Flexibility of administration
		X97	Levels of trust
		X98	Amount of conflict and frustration
		X99	Problem solving styles used
		X910	Use of talents and expertise
		X911	Types of supervision and control
		X912	Types and adequacy of recognition and rewards
		X913	Decision making styles
		X914	Amount of power associated with participation
		X915	Equity of treatment and rewards
		X916	Organizational health
		X917	Long term planning and goal setting
		X918	Intellectual orientation

each of which independently discriminates among the groups of institutions.

The explanatory variables used in the discriminant analysis were selected because they have been found in other research to have some relationship to organizational effectiveness. These variables are grouped into the following categories: (1) perceptions of organizational structure and dimensions of the external environment, (2) the strategic emphases of top administrators, (3) organizational goal preferences, (4) financial indicators, and (5) organizational demographics. Table 2 lists the variables in

TABLE 2
Predictor Variables Used in Differentiating Among Effectiveness Domains (with References and Reliability Coefficients)

Organizational Structure and Organizational Environment
(Duncan, 1973; Hirsch, 1975; Ivancevich & Donnelly, 1975; Miles & Cameron, 1977; Negandhi & Reimann, 1973; Osborn & Hunt, 1974; Pennings, 1975, 1976; Reimann, 1974)

Environmental richness (89)
Environmental turbulence (74)
Environmental control (74)
Environmental support (74)
Centralization (61)
Standardization (61)
Professionalization (61)

Strategic Emphases of Administrators
(Child, 1974, 1975; Miles, 1980; Miles & Cameron, 1977; Miles, Snow & Pfeffer, 1974)

Internal/external (55)
Proactive/reactive (77)
Finances and budgeting[b]
Academics and scholarship[b]
Legal matters[b]
Students affairs[b]
Fund raising[b]
Public service[b]
Politics and public relations[b]

Organizational Goals
(Campbell, 1977; Molnar & Rogers, 1976; Price, 1972; Scott, 1977; Steers, 1977)

Goal clarity (98)
Importance of goals concerning:[d]
  Student educational satisfaction
  Student academic development
  Student career development
  Student personal development
  Faculty/administrator satisfaction
  Professional development of faculty
  Community interaction and system openness
  Acquiring resources from the environment
  Organizational health

Financial Variables
(Astin, 1977; Baldridge, Curtis, Ecker, & Riley, 1978; Bowen, 1973, 1977; Meeth, 1974)

Revenues (1970-1976) from:[a]
  Federal government
  State government
  Local government
  Private gifts
  Endowment
  Tuition and fees
Total budget
Value of endowment

Expenditures (1960-1976) for:[a]
  Research
  Student aid and student services
  Public service
  Academic support
  Library books
  Auxiliary enterprises
  Physical plant

Demographic—Context Variables
(Baldridge et al., 1978; Bowen, 1977; Garbarino, 1973; Kemmerer & Baldridge, 1975; Lupton, 1976; Silber, 1976; Vermilye, 1976)

Affiliation (public/private)[c]
Unionization[c]
Age[a]
Highest degree offered[c]
Percent of terminal degree holders[a]
Types of programs offered[c]
Student/faculty ratio[a]
Enrollment[a]
Number of faculty[a]
Number of departments[a]
Size of library[a]

[a] Absolute values used.
[b] Rating from 1 = very high emphasis to 7 = no emphasis.
[c] Dummy coded.
[d] Rating from 1 = not at all important to 7 = extremely important.

each category along with the references to some studies associating the variables with organizational effectiveness. Internal reliabilities or coding schemes are also presented in the table for each variable. Interested readers are referred to Cameron (1978b) for a detailed theoretical justification for the inclusion of each variable and for additional psychometrics.

RESULTS

Effectiveness Dimensions

The same 9 dimensions of effectiveness found in Cameron (1978a) emerged in these 41 institutions. The dimensions are listed in Table 1. The internal consistency reliabilities for each of the dimensions range from .83 to .99. Average within-dimension correlations are higher than the outside-dimension correlations at the $p < .001$ level for each dimension, indicating that internal consistency and discriminant validity are acceptable. An interdimension correlation matrix revealed an average correlation in the 9×9 matrix of .39, indicating that several of the dimensions moderately covary across the 41 institutions. Oblique factor analytic results also provide evidence of the clarity of the dimensions inasmuch as items from eight of the nine dimensions load highly on their own factors. (An oblique rotation was used inasmuch as the nine dimensions are not assumed to be orthogonal. Factor analytic results are not reported here to conserve space, but they can be obtained from the author.) One of the dimensions, student academic development, does not load on any of the factors. These results show that the nine dimensions of organizational effectiveness as identified by the dominant coalition have high internal consistency reliability and statistically significant discriminant validity, although they do possess moderate intercorrelation.

Mean scores for each institution were examined across the nine dimensions. It was found that each institution displays a relatively unique pattern of scores on the dimensions. That is, no two institutions were rated as having identical profiles of effectiveness. MANOVA and univariate ANOVAs tested the statistical significance of these differences and, as reported in Table 3, significant differences exist among the institutions on each of the nine dimensions. No significant differences were found among the five different job categories, however, except on the system openness and community interaction dimension. That is, respondents in different job categories in the institutions did not differ significantly in their ratings of effectiveness on any of the dimensions except one. And in the case of that one dimension, the variance accounted for (η^2)is only 1 percent.

Domain Identification

In order to identify the organizational domains represented by these nine dimensions and to assess effectiveness levels in those domains, the

TABLE 3
Multivariate and Univariate Analysis of Variance for the Effectiveness Dimensions

MANOVA[a]	*Institution*		*Job*		*Institution × Job*	
	F	θ	*F*	θ	*F*	θ
	42.86**	.52**	1.59*	.02	1.20	.04

		Institution		*Job*	*Institution × Job*	
ANOVA	*Multiple* R^2	*F*	η^2	*F*	η^2	*F*
1. Student educational satisfaction	.39	50.76**	.38	2.13	.01	1.00
2. Student academic development	.48	126.61**	.48	1.12	.01	.82
3. Student career development	.37	80.51**	.36	.32	.01	1.40
4. Student personal development	.23	13.56**	.23	.78	.01	1.22
5. Faculty and administrator employment satisfaction	.20	9.68**	.18	1.67	.01	.45
6. Professional development and quality of the faculty	.44	89.30**	.43	.50	.00	1.30
7. System openness and community interaction	.15	2.88*	.14	2.58*	.01	.72
8. Ability to acquire resources	.52	83.60**	.52	1.27	.01	1.64
9. Organizational health	.16	12.24**	.15	.74	.01	.54

[a] Degrees of freedom for institution were 36 and 4813; for job, 36 and 4813; and for the interaction, 144 and 10162.

*$p < .05$

**$p < .001$

nine effectiveness dimensions and the 41 institutions were clustered using the CONCOR algorithm. A matrix was formed in which institutional clusters were matched with effectiveness dimension clusters to form groups of institutions differing in domains and in effectiveness levels. These groupings form the domains of organizational effectiveness. The four clusters of effectiveness *dimensions* were:

(1) An *external adaptation* cluster of dimensions comprising student career development and system openness and community interaction. The criteria comprising these dimensions indicate that high scoring institutions are successful in interactions involving the external environment. The community involvement of the institution and the focus given to student preparation for outside-of-school employment are the two key dimensions, and both emphasize environmental interaction.

(2) A *morale* cluster comprising student educational satisfaction, faculty and administrator employment satisfaction, and organizational health. This cluster is concerned with student, faculty, and administrator satisfaction and with the health of internal institutional processes. Schools scoring high on this cluster are typified by high morale among organizational members and by high levels of trust, member commitment, conflict resolution, etc.

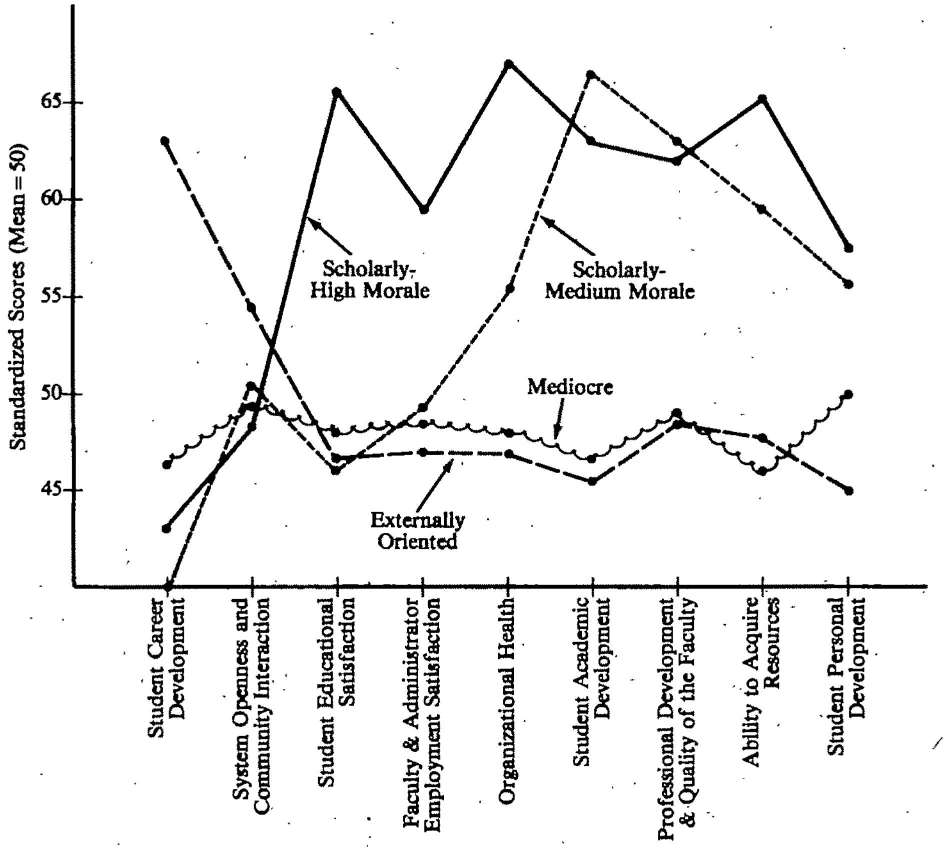
(3) An *academic-oriented* cluster comprising student academic development, professional development and quality of the faculty, and ability to acquire resources. These dimensions relate to traditional academic

activities and to educational outputs, i.e., the academic development of students and the professional development of the faculty. At first blush, the ability to acquire resources dimension seemed not as central to the academic label as were the other dimensions. Closer inspection of the criteria comprising that dimension, however, shows that they relate to the ability of the institution to obtain high quality faculty, students, research grants, and other financial resources, and the consistency of those transactions with the label "academic orientation" seems reasonable.

(4) An *extracurricular* cluster comprising a single dimension, student personal development. These criteria relate primarily to personal, nonacademic development of students, and extracurricular activities.

Four groupings of *institutions* that possess similar scores on the effectiveness dimensions also emerged from the clustering procedure. Figure 1 presents the effectiveness profiles for the four institutional clusters across the nine dimensions of effectiveness. Two of these institutional groups score high on the academically oriented dimensions, consequently they are

FIGURE 1
Profiles of Effectiveness for Four Institutional Clusters



given the label "scholarly institutions." These two groups differ, however, in their scores on the effectiveness dimensions relating to the satisfaction of students, faculty members, and administrators, and with internal organizational health. Therefore one group is labelled "scholarly-high morale" because it maintains the highest scores on the satisfaction and organizational health dimensions, and the other is labelled "scholarly-medium morale" because its scores are about average on the morale dimensions. A typical scholarly-high morale institution is one that is highly successful academically and has high morale among organizational members. An institution in the scholarly-medium morale cluster is typified by highly successful academic achievement but average member satisfaction and internal organizational health.

Another cluster consists of institutions scoring slightly below average on most of the dimensions of effectiveness. This group displays relatively little variance across the nine dimensions and does not excel in any domain of effectiveness. This cluster is labelled the "mediocre group" because of the average and below average levels of effectiveness displayed.

The final cluster of institutions shows extremely high scores compared to the other three clusters on *student career development* and on *system openness and community interaction*—the two external adaptation dimensions—and this group is labeled the "externally oriented group." As shown in Figure 1, however, this external group has low scores on all the other effectiveness dimensions. Hence, a school in this cluster is one that excels in the effectiveness domain relating to external transactions but does rather poorly in other domains of organizational effectiveness.

Differences Among Clusters

Table 4 presents the standardized mean scores for each grouping of effectiveness dimensions (domains) and institutional clusters as well as the

TABLE 4
Differences Among Groups of Institutions Across Four Domains of Effectiveness (Standardized Scores, Mean = 50)

	Domains			
Institutional Groups	*External Adaptation*	*Morale*	*Academic*	*Extracurricular*
Scholarly-high morale ($N=5$)	46.02	62.01[b]	63.45[c]	57.43
Scholarly-medium morale ($N=4$)	44.69	49.95	62.42[d]	55.42
Externally oriented ($N=8$)	58.81[a]	46.79	47.46	44.13
Mediocre group ($N=24$)	48.08	47.28	46.81	49.96

[a] The externally oriented group differs from the mediocre group and the scholarly-high morale group at the $p<.06$ level.

[b] The scholarly-high morale group differs from all other groups at the $p<.01$ level.

[c] The scholarly-high morale group differs from the externally oriented group and the mediocre group at the $p<.01$ level.

[d] The scholarly-medium morale group differs from the externally oriented group and the mediocre group at the $p<.01$ level.

results of the F tests for significant differences among the means. Statistically significant differences were observed among certain of the groups of institutions in a comparison of their effectiveness across the four domains. The externally oriented group, for example, differs from the other groups in the external adaptation domain at the $p < .06$ level. The scholarly-high morale group differs significantly from all other groups of institutions in the morale domain ($p < .01$). And both scholarly groups differ significantly from the other clusters in the academically oriented domain at the $p < .01$ level. No significant differences exist among any of the four groups in the extracurricular domain.

Predicting Institutional Differences

To explain these significant differences in domain effectiveness among the groups of institutions, discriminant analysis procedures were used employing the variables listed in Table 2 as predictors. Because of degrees of freedom problems it was inappropriate to include all the variables in a single discriminant analysis. Therefore, each of the five categories of explanatory variables was included in a separate stepwise discriminant analysis in order to determine which variables are most powerful in discriminating among the institutions. Variables were kept only if they contributed significantly to the discriminating power of a statistically significant function as determined by a partial F of 1. Emerging were 14 variables, which were then included in a final discriminant analysis.

Table 5 reports the results of the final discriminant analysis, and Figure 2 plots the centroids for the three significant discriminant functions. Based on these 14 variables, 97.6 percent of the institutions can be correctly classified into their proper effectiveness cluster when the probability of being classified into each group is constrained to be equal (Klecka, 1975). Only one institution is incorrectly classified on the basis of its scores on these predictor variables. This analysis provides evidence that the resulting 14 variables are very powerful in explaining differences among the 4 groups of institutions. (Conducting two successive discriminant analyses for each variable, in reducing the data, capitalizes on chance; consequently, the discriminating power of the variables may be inflated.)

Each of the discriminant functions may be thought of as an important underlying *dimension of differences* among the institutional groups. Furthermore, each of these underlying dimensions (functions) is independent of the other functions; that is, the second function explains differences not accounted for by the first function, and the third function explains differences not accounted for by the first two functions. It is informative, therefore, to interpret each discriminant function individually with respect to the institutional groups. Correlations of the variables with the discriminant score are relied on for interpretation rather than the discriminant weights inasmuch as the correlations are not sensitive to intercorrelation among the explanatory variables (Bargmann, 1970; Perreault & Miles, 1978). Tatsuoka (1971) refers to these correlations as the structure matrix.

TABLE 5

The Fourteen Most Important Variables in Discriminating Among the Four Clusters of Institutions

Function	*Eigenvalue*	*Canonical Correlation*	*Wilks' Lambda*	*Chi Square*	*d.f.*	*Significance*
1	9.94096	.953	.0129	134.815	42	.000
2	1.86670	.807	.1414	60.648	26	.000
3	1.46751	.771	.4053	28.000	12	.006

Variable	*I*		*II*		*III*	
	A	*B*	*A*	*B*	*A*	*B*
Change in enrollment (51-75)	.189	.406***	-.247	.094	.099	.054
Tuition charged	-.398	-.745***	-.333	-.239	.196	-.095
Age of institution	-.385	-.316**	.474	.165	-.492	-.618***
Goal of career development	-.498	-.826***	.344	-.061	-.281	-.007
Goal of faculty development	.020	.512***	.429	.523***	.173	.111
Emphasis on fund raising	-.180	.515***	-.127	.069	-.255	.029
Liberal arts program	-.322	-.381**	.418	.506***	.352	.212
Teacher training program	.106	.156	.274	.453***	.249	.260*
Professional program	.214	.158	-.065	-.079	-.246	-.433***
State revenue for research	-.133	-.313**	-.357	-.437***	.311	.256*
Revenue from endowment	-.105	-.499***	-.367	-.360**	1.171	-.227
Value of endowment (71)	.186	-.479***	.173	-.334**	-1.297	-.466***
Expenditures/academic support	-.189	-.127	-.223	-.314**	.768	-.243
Total expenditures	.230	-.111	-.180	-.170	-.492	-.445***

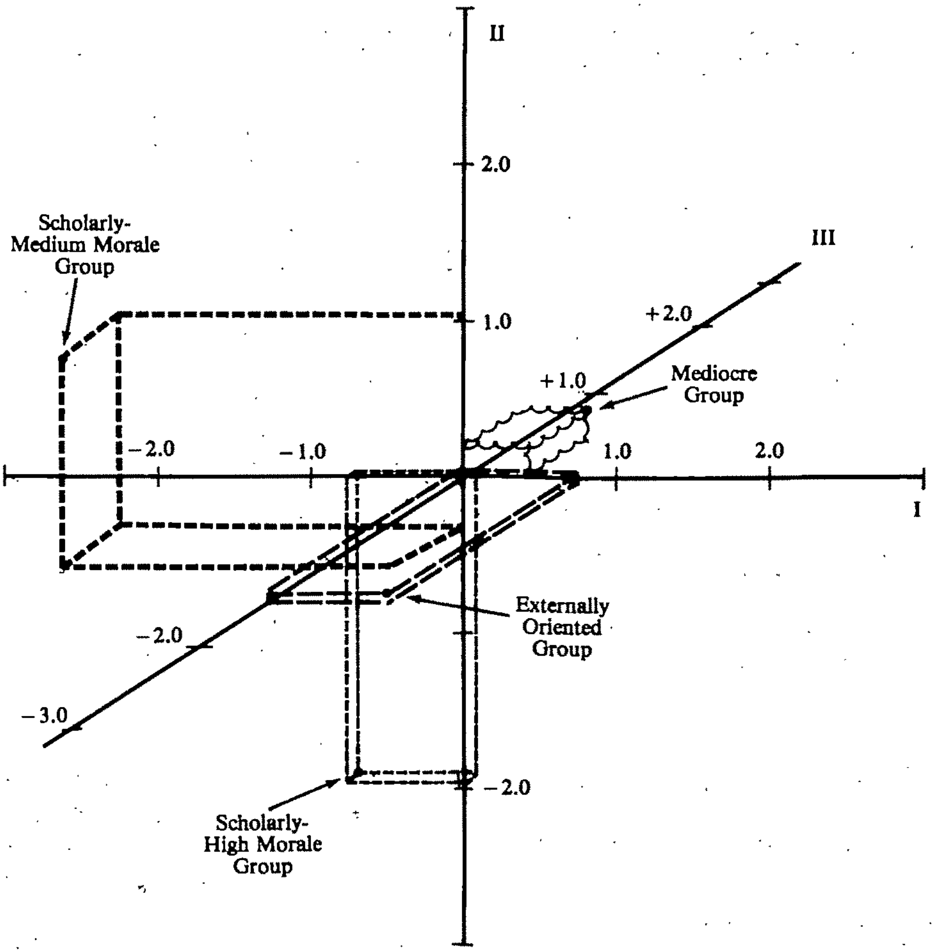
I = First discriminant function
II = Second discriminant function
III = Third discriminant function
A = Discriminant function weight
B = Correlation with discriminant score
*$p<.05$
**$p<.01$
***$p<.001$

The first discriminant function separates the two scholarly groups from the externally oriented and the mediocre groups. The centroids of the scholarly-medium morale and the scholarly-high morale groups fall on the negative side of the axis in Figure 2. The mediocre and external groups are on the positive side.

The two scholarly groups tend to be older liberal arts institutions with high revenues from tuition and endowment. Futhermore, they have high revenues for research and high endowment values. The distinguishing attributes of the external and mediocre clusters on this function, on the other hand, are an emphasis on fund raising, faculty development, and dynamic (growing) enrollments. This first discriminant function, therefore, distinguishes between well-established institutions and developing institutions. The scholarly institutions are characterized by attributes typical of wealthy, old, venerable universities, whereas the external and mediocre institutions appear to be engaged in the process of advancement and enrichment.

The second function mainly separates the scholarly-high morale group from the scholarly-medium morale group. Small differences exist between the external and the mediocre groups. The scholarly-high morale group is

FIGURE 2
Plots of Group Centroids for the Three Significant Discriminant Functions



Group	*Centroid I*	*Centroid II*	*Centroid III*
Scholarly-High Morale	−.84	−2.01	.04
Externally Oriented	.78	.02	−1.33
Scholarly-Medium Morale	−2.34	1.09	−.51
Mediocre	.30	.23	.52

characterized by high revenues in endowment, a high endowment value, and by high research-oriented revenues and expenditures. The scholarly-medium morale group, on the other hand, is typified by liberal arts and teacher training programs and by faculty professional development. This discriminant function distinguishes between wealthy, research institutions and institutions with faculty development and teaching emphasis. Speaking more simplistically, the differences may be typified as teaching versus research orientation, assuming that the wealth factors are associated with research institutions.

The third function accounts for differences not accounted for by the first two functions. This function distinguishes the externally oriented and the scholarly-medium morale groups (negative side of the axis) from the scholarly-high morale and mediocre groups (positive side of the axis). Variables such as high endowment value and high expenditures are coupled with older institutional age and the offering of professional programs in the external and scholarly-medium moral group. Teacher training and high research revenues, on the other hand, are typical of the scholarly-high morale and the mediocre groups. This function, therefore, may be interpreted as being a separation of "professional" institutions from "academic" institutions. The academically oriented groups (scholarly-high morale and mediocre schools) seem to be exemplified by traditional teaching and research emphasis, whereas the professionally oriented groups (external and scholarly-medium morale) appear to have high expenditures for professional programs. The differences might be stereotyped as being between schools emphasizing law, medical, engineering, and business degrees versus schools interested in nonprofessional teaching and research activities.

TABLE 6
Major Distinguishing Characteristics of the Institutional Groups

Institutional Group	*Major Distinguishing Characteristics*
Scholarly-high morale group	*Affluent, Academic Institutions* Charges high tuition High endowment revenue High endowment value High state revenue for research High expenditures for academic support Offers liberal arts programs
Scholarly-medium morale group	*Affluent, Professional Institutions* Charges high tuition High endowment revenue High endowment value High state revenue for research Goal of faculty development High total expenditures Offers professional programs
Externally oriented group	*Developing, Professional Institutions* High endowment value Emphasis on fund raising Goal of faculty development Growing enrollments High total expenditures Offers professional programs
Mediocre group	*Developing, Teaching Institutions* High emphasis on fund raising Goal of faculty development Growing enrollments Offers teacher training programs

Interpretations of Institutional Characteristics

The discriminant functions point out that different types of institutions differ in the domains in which they excel. Table 6 summarizes the institutional characteristics typical of each group of institutions. For example, scholarly-high morale institutions, which excel in the academic and morale domains, seem to be best typified by institutional wealth and research activity. Institutions that possess the characteristics of the scholarly-high morale group, therefore, might best be labelled *affluent, academic* colleges and universities.

Many of the variables indicating institutional wealth also are typical of the scholarly-medium morale group. However, there also is an emphasis among these schools on professional programs and professional development of the faculty. Thus, when characterized on the basis of their institutional characteristics, the scholarly-medium morale institutions are labelled *affluent, professional* institutions.

Institutions that excel in the external adaptation domain but do poorly in the other three domains are exemplified primarily by indicators of growing enrollment, fund raising, faculty development and the offering of professional programs (e.g., law, medicine, business). This mix of predictor variables suggests that the label *developing, professional* is an appropriate summary for the externally oriented cluster.

Finally, the mediocre group, those institutions that do not show distinctive competence in any of the domains, are typified as *developing, teaching* institutions because teacher training programs and indicators of institutional development (e.g., emphasis on fund raising, growing enrollments, faculty development) are typical characteristics.

DISCUSSION

These analyses show that four major domains of effectiveness exist for colleges and universities from the standpoint of the internal dominant coalition—an academic domain, a morale domain, an extracurricular domain, and an external adaptation domain. Furthermore, four groups of institutions are found to differ significantly from one another in their levels of effectiveness in these domains. These are (1) a scholarly-high morale group, which is rated as highly effective in the academic and morale domains but as very ineffective in the external adaptation domain; (2) an externally oriented group, which is highly effective in the external adaptation domain but ineffective in all other domains; (3) a mediocre group, composed of schools that score below average in effectiveness in all the domains; and (4) the scholarly-medium morale group, which excels in the academic domain, is average in the morale domain, and is ineffective in the external adaptation domain.

Each of these four groups of institutions is typified by a unique set of institutional characteristics (Table 6). Affluent, academic college characteristics are most closely associated with the scholarly-high morale group.

Affluent, professional college characteristics typify the scholarly-medium morale group. Characteristics summarized as developing, professional traits typify the externally oriented institutions, and developing, teaching characteristics are associated with the mediocre schools.

Significant differences existing among the four groups of institutions in their domains are associated with three major institutional characteristics—the type of academic program offered, institutional affluence, and institutional stability. On the basis of the discriminant functions, a parsimonious summary of the findings would suggest that the types of institutions excelling in the academic effectiveness domain are wealthy, research oriented, liberal arts institutions; those excelling in the external adaptation domain are developing, professionally oriented institutions; and those excelling in the morale domain are well-established, stable institutions. All institutions seem to do about equally well in the extracurricular domain.

IMPLICATIONS

Three main implications of these results have relevance for organizational theorists and for evaluators of organizational effectiveness. They can be stated in the form of propositions.

1. *Organizational effectiveness is a multidomain construct.* Because each of the four major approaches to organizational effectiveness emphasizes a limited domain set, the complexities of organizational effectiveness and the multiple levels of effectiveness that are inherent in organizations frequently are ignored. That is, the use of only one of the four models of effectiveness may limit unwittingly the evaluator to a narrow set of relevant effectiveness domains. The system resource model, for example, is most closely associated with the external adaptation domain in colleges and universities, the process approach seems to parallel the morale domain, and the goal model may be compared to the academic domain.

If one defines and assesses organizational effectiveness on the basis of organizational goal accomplishment, for example, significant differences in effectiveness domains—which actually exist among colleges and universities and which may be very important to potential students, faculty, or funders—would be masked. Most of the institutions in this study would appear to be largely the same in effectiveness, as evidenced by the fact that the institutions are not distinguishable on the basis of their goals. On only one goal did the institutional groups differ significantly (Table 5).

Similarly, if effectiveness is defined simply as the ability of the organization to acquire resources from the environment (the system resource model), effectiveness in the morale domain, the extracurricular domain, and much of the academic domain would be ignored in colleges and universities.

Also implied is that different models of effectiveness may be relevant to different types of organizations. Cameron (1980) argues, for example, that none of the four models of effectiveness—the goal model, the system resource model, the process model, the strategic constituencies model—is appropriate in organizations such as colleges and universities because of the anarchistic nature of those organizations. Goodman (1979) argues not only that different models of effectiveness are needed for different types of organizations, but that appropriate models may differ even among organizational subunits. This is partly because domains of effectiveness are grounded in *post hoc* choices of organizational constituencies (e.g., dominant coalition members) regarding what organizational activities will be emphasized (Cyert & March, 1963), what the organization already knows how to do (March & Simon, 1958; Weick, 1979), and what criteria can be agreed upon (Lindblom, 1959). Different types of organizations with different dominant coalitions are not likely to produce the same domain sets.

This study illustrates that a general construct of organizational effectiveness that is applicable to all types of organizations and to all domains of organizational activity is not likely to develop. And, because of the multiple domain nature of the construct, a general model of effectiveness may not be very enlightening anyway.

2. *When organizational effectiveness is viewed as a multidomain construct, the relationships among other organizational variables are altered.* That is, the distinctive organizational characteristics of institutions of higher education that differ in their domain effectiveness illustrate one possible reason why confusing and contradictory findings have been reported in the literature examining various organizational level variables. Berger and Cummings (1979), Ford and Slocum (1977), and others, for example, conclude that relationships among variables such as organizational structure, technology, size, and the external environment are ambiguous and problematic. In most organizational studies, however, researchers have not controlled for the effectiveness of the organizations they have investigated, let alone for the variety of "effectivenesses" typical of most organizations. Yet there is no reason to expect that the same relationships among variables (e.g., technology and structure) will hold in ineffective organizations as hold in effective organizations, and the relationships are likely to change in organizations with different patterns of effectiveness across domains.

Duncan (1973) and Lawrence and Lorsch (1967), for example, report that effective organizations are typified by different organizational structure–external environment relations than are ineffective organizations. Reimann (1974) found that industrial organizations that are rated as effective are different in structure from that of ineffective industrial organizations. Pennings (1975) found that structural variables are different for highly effective brokerage firms than for ineffective firms, although the goodness of fit between structure and environmental variables was not dependent on effectiveness.

This study points out how institutions may be typified by a unique pattern of organizational effectiveness across certain domains, and that each major effectiveness profile may be associated with a different set of institutional characteristics. That is, not only may effective organizations be structured differently from ineffective organizations (Reimann, 1974), but organizations typified by success in one effectiveness domain may have different organizational characteristics than organizations with success in another organizational effectiveness domain. The focus on only one overall rating of effectiveness for an organization masks these findings. The relationship of institutional growth and effectiveness provides one example.

Norris (1976) suggests that institutions that are growing in enrollments differ in effectiveness from institutions that are static. In fact, growth has been a major indicator of effectiveness in higher education in the past (Dressel, 1971). What this study points out, however, is that growth is associated with *ineffectiveness* in the academic, morale, and extracurricular domains. Only in the external adaptation domain is enrollment growth associated with high levels of success. That is, in institutions typified by growth, effectiveness is rated low in academic, morale, and extracurricular domains and high in the external adaptation domain. This suggests that in periods of growth and dynamism, institutions trade off internal effectiveness (i.e., academic, morale, and extracurricular effectiveness) for effectiveness in adapting to the external environment. In periods in which little or no growth is experienced, the external adaptation domain may then become less important and internal effectiveness is emphasized.

It is proposed that organization level research begin to account for the effectiveness of organizations and the possible differences in effectiveness across domains before conclusions are drawn. Part of the confusion and contradiction in findings in macro organizational research may derive largely from treating organizations as if they have only one effectiveness domain, from ignoring organizational effectiveness as a control variable, and from not considering the possibility that effectiveness domain selection may be a causal factor in determining structural, technological, and/or environmental interrelationships.

3. *Organizational effectiveness in external domains may mitigate against effectiveness in internal domains.* Dubin (1976) speculated that because organizations are ambivalent about whether to maximize internal organizational effectiveness or external organizational effectiveness, achievement of both is unlikely. According to his hypothesis, organizations are either internally successful or externally successful, but not both. This study's results seem to support Dubin's hypothesis. That is, institutions that are effective in the external adaptation domain are not effective in the internal domains (i.e., academic, morale, extracurricular) and vice versa. An examination of the relative rankings of effectiveness for each of the 41 institutions in the 4 domains reveals that no institution scored in the top 20 in every domain; and of the institutions ranked in the top 10 in the external adaptation domain, the average ranking in the academic domain is 22, the average ranking in the morale domain is 19, and in the extracurricular domain is 29.

On a pragmatic level, this implies that institutions of higher education that achieve the highest external visibility, and therefore may show up more often on prestige polls or ratings of institutional reputation, may be less effective in the traditional academic domain and in internal morale than are schools that don't make those lists. That is, schools rated as doing well academically are rated rather poorly in the external adaptation domain, and schools achieving high external adaptation scores do rather poorly in the academic domain.

If it is correct to assume that schools that are highly effective in the external adaptation domain achieve more external visibility, then it is important to interpret with caution the frequently published listings of "top" institutions based on prestige or general quality ratings (Ladd & Lipset, 1979; Cartter, 1966; Ross, 1977). These polls may represent just the reverse of what potential students and administrators think they represent (i.e., high ratings equal low academic effectiveness).

This study serves largely as an exploratory step in identifying and predicting domains of organizational effectiveness, and more research is needed to expand and develop this notion. In institutions of higher education, for example, more refined measurements of the major predictor variables found to be important in differentiating organizational types are needed. One weakness of this study is the possibility of random error effects because of the number of variables included and the data reduction procedures necessitated. Follow-up research should focus on the few predictor variables that appear to be key.

In other types of organizations, research efforts should begin to focus on domains of effectiveness rather than on overall assessments. This does not mean that the organizational level of analysis should be abandoned in favor of subunit or individual performance analyses. Rather it means that assessments should be sensitive to the different effectiveness domains present in organizations and the probability that different levels of effectiveness exist across the different domains. Furthermore, organizational effectiveness should begin to be used more widely as a control variable in organization-level research.

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An Examination of the Organizational Antecedents of Stressors at Work[1]

SAROJ PARASURAMAN
Wayne State University
JOSEPH A. ALUTTO
State University of New York at Buffalo

This paper identifies seven sources of stress in the work environment and examines the relationship of contextual, task, and role-related variables to such stressors. Both the type and magnitude of the stressors were found to differ significantly among the five subsystems and three job levels of the firm under study. The task dimensions of complexity, routinization, interdependence, and closeness of supervision demonstrated weak to moderate relationships with several stressors.

Following the original work of Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964), much of the research on organizational stress has focused on role conflict and role ambiguity as the principal sources of stress in organizations. Considerably less attention has been devoted to the investigation of stressors that emanate from sources other than particular conflicting or ambiguous role expectations; i.e., situational factors acting independently of the role set as potential sources of stress. Furthermore, relatively little research attention has been directed toward examination of the antecedents of various situational stressors. This limited focus may result from the fact that in the Kahn et al. (1964) formulation, role stresses are assumed to be a function primarily of sent role pressures and only indirectly influenced by organizational factors. The model of stress formulated recently by McGrath (1976) goes beyond role theory and facilitates consideration of a broader range of potential stressors as well as their organizational antecedents. In this model, stressors are conceptualized as environmental conditions or situations which, if left unmodified, are perceived by

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the focal person as leading to some undesirable state of affairs. The model posits that such potential stressors originate in tasks, roles, and behavior settings; the latter refers to the locus or context of organizational activities. Building on the conceptual frameworks provided by Kahn et al. (1964) and McGrath (1976), the present study attempts to identify different types of stressors in the work place and examines the extent to which these sources of stress are nested in contextual, task, and role-related properties of the organization. In this paper, the terms stressor or sources of stress are used to refer to the external demand or stimulus factors perceived as undesirable (McGrath, 1976), and the term "felt stress" is used to denote the psychological state of disturbed affect in response to such factors (Janis, 1958; Levi, 1967; McGrath, 1970).

PREVIOUS RESEARCH

A close examination of the stress literature indicates that although diverse elements in the work environment have been investigated as sources of stress, for example, McLean (1978), there is little commonality in the approaches or concepts used across studies. Thus time constraints (Hall & Lawler, 1970), productivity emphasis (Klein & Ritti, 1970), and heavy workload (Buck, 1972) have been described as stressors, as was the case with unpleasant and hazardous working conditions, and excessive and inconvenient hours, including shift work (Kornhauser, 1965; Mott, Mann, McLoughlin, & Warwick, 1965). Factors intrinsic to the job such as paced-repetitive work, lack of opportunities to use valued skills and abilities, and high costs and penalties of mistakes also have been identified as stressors in the work setting (Kornhauser, 1965; Buck, 1972; Kearns, 1973). The lack of a common theoretical framework is most evident in the inconsistent treatment of given stressors across studies. For example, task characteristics have been treated as stressors in themselves (Kornhauser, 1965; Buck, 1972), as antecedents of stressors (Hall & Lawler, 1970; Brief & Aldag, 1976), and as moderators of the role stress-role response relationship (Beehr, 1976; Abdel-Halim, 1978). Similarly, supervisory behavior has been identified both as a stressor (Buck, 1972) and as a moderating variable (Klein & Ritti, 1970).

In order to extend the knowledge of the different types of stressors at work, therefore, it is necessary to have a conceptual basis for the identification of potential stressors and their originating conditions. Cooper and Marshall (1977) distinguish between extraorganizational and intraorganizational sources of stress, the latter consisting of five broad categories of stressors: factors intrinsic to the job, role in the organization, relationships within the organization, career development, and organizational structure and climate. Kahn and Quinn's (1970) classification scheme of sources of stress suggests that discrepancies between expectations and the organizational and personal resources available to the role occupant may be the genesis of some stressors. Thus, resource inadequacies with regard to materials, equipment, or personnel, time constraints, and inadequate authority could act as potential stressors to a focal role performer. Stressors may arise also from situational factors as proposed by Nix and Bates (1962). Sources of stress in this category could include equipment breakdowns, delays in task completion by individuals in functionally interdependent roles, and other work interruptions. French and Caplan's (1973) differentiation of work overload in terms of quantitative (too much work) and qualitative (work that is too difficult) overload represents additional categories of potential stressors.

The attitudinal and behavioral outcomes of various stressors have been widely researched and well documented (Kahn et al., 1964; Sales, 1970; Rizzo, House, and Lirtzman, 1970; Lyons, 1971; Tosi, 1971; Schuler, 1975; Beehr, 1976; Miles, 1976). Only a few studies, however, have investigated the organizational determinants of such stressors (House & Rizzo, 1972; Rogers & Molnar, 1976; Miles & Perreault, 1976; Schuler, 1977a). These studies tend to support the theoretical perspective of stressors as critical intervening variables in models of organizational behavior, and they highlight the importance of examining organizational characteristics serving as generators of felt stress. Thus, structural factors such as formalization have been found to be related to perceived role stress (House & Rizzo, 1972; Rogers & Molnar, 1976). Schuler's (1977a) results suggest that incongruencies in the fit between task-technology and structure influence the importance of different sources of stress. Other studies indicate that various task dimensions, e.g., job challenge, task identity, and autonomy, are differentially related to stressors (Hall & Lawler, 1970; Brief & Aldag, 1976; Rogers & Molnar, 1976).

There is some evidence to suggest that sources of stress are not randomly distributed within an organization, rather they vary systematically among different roles and different positions or levels in the organizational hierarchy (Kahn et al., 1964; Schuler, 1977b; Miles, 1976). Contextual factors or the behavioral setting surrounding members' responses constitute another basis for assessing the distribution and relative magnitude of different stressors. Katz and Kahn (1966) postulated that interpretations of a system tend to be based on individuals' experiences within the sector of organizational space in which they are located. Recent job attitude research (Herman, Dunham, & Hulin, 1975; Newman, 1975; Adams, Laker, & Hulin, 1977) provides evidence that functional specialty and departmental and shift assignments importantly index members' reports about their work experiences. The relationship of such contextual variables to sources of stress has been largely unexplored. Thus, in organizations that are differentiated along several dimensions, it appears that relevant micro environments as represented by differential work group affiliations and shift assignments may provide important contextual referents for the assessment of different stressors. In other words, participation in particular functional groups and work shifts may affect individuals' perceptions of their ability to perform their organizational role effectively, and thereby the perceived magnitude of different stressors.

The diverse findings reported in the studies referenced above serve to highlight the complex and multivariate nature of stressors in the work setting and their relationship with important organizational dimensions. A more complete understanding of work-related stressors and their originating conditions thus necessitates the examination of contextual factors or key organizational dimensions of the behavior setting, as well as role-related variables and task characteristics as potential augmentors of different stressors. The present study addresses this need and brings together the relevant strands of theory and previous research into an integrated conceptual framework for the examination of different stressors and their organizational antecedents. The study is part of a larger multidimensional study encompassing both the predictors and outcomes of stressors in the work environment, but due to length constraints, the scope of this paper is limited to a discussion of the organizational antecedents of various sources of stress.

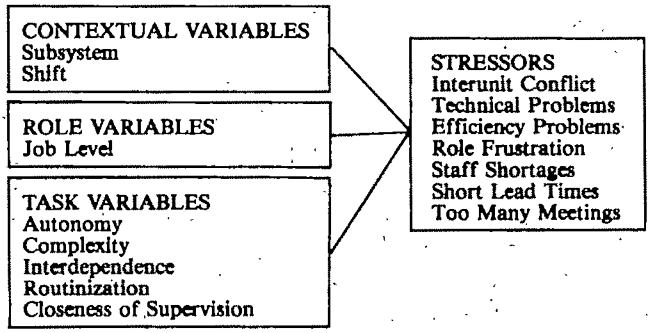
RESEARCH DESIGN

Based on the theoretical formulations of Kahn et al. (1964), and McGrath (1976) and related empirical research, the present study proposes an integrated model for investigating simultaneously the relationship of contextual, task, and role-related variables to stressors in the work environment. Figure 1 summarizes the key elements of the research design.

Stressors represent the dependent variables in the model. They are conceptually defined as job demands, constraints, and job-related events or situations that may affect an individual's role fulfillment. As such, they constitute possible sources of felt or perceived stress. This definition recognizes that such situations are not in themselves "stressful," but that they may be capable of producing psychological stress and strain in individuals, depending on personal attributes and other factors. In this study, therefore, a distinction is made between potential stressors as external

FIGURE 1

Research Design: Contextual, Task, and Role-Related Antecedents of Organizational Stress



stimulus factors and felt stress as the state of disturbed affect in response to environmental stressors. Based on this conceptual definition of stressors, for the purposes of this study seven stressors were identified: interunit conflict, technical problems, efficiency problems, role frustration, staff shortages, short lead times, and too many meetings. The development and operationalization of these variables are described in the method section of this paper.

The model includes subsystem and work shift as contextual antecedents of different stressors. Context refers to an individual's location in organizational space. The concept of subsystem recognizes individuals' membership in different functional units as a primary basis for differential behavioral orientations and psychological separation (Katz & Kahn, 1966; Lawrence & Lorsch, 1967). The variable thus taps a fundamental dimension of horizontal differentiation, i.e., differentiation by function, rather than authority or responsibility. Five subsystems are examined as possible contextual referents for the different stressors: administrative subsystem, single-product production subsystem, multiproduct production subsystem, technical support subsystem, and boundary subsystem. On the other hand, use of shift assignment as a variable recognizes the temporal dimensions of separation in terms of organizational space. That is to say, assignment to different work schedules forces separation between workers on different shifts and provides opportunity for greater perceptual consistency among employees on the same work schedules.

The role-related characteristic included in the model is job level or position in the organizational hierarchy. According to Katz and Kahn (1966), the positional aspect of role provides another source of differential perceptual orientations. Based on their conceptualization of the vertical dimensions of position, job level in this study refers to formal rank and authority, as well as status differentials based on job type. The vertical differentiation of roles is captured in three job levels—high, medium, and low.

Task characteristics comprise the third set of antecedent variables in the model. Although some studies have treated task characteristics as situational factors moderating the affective reactions of individuals to stressors (Beehr, 1976), the findings of other researchers (Hall & Lawler, 1970; Brief & Aldag, 1976; Rogers & Molnar, 1976) attest to the relevance of examining task attributes as distinctive antecedent factors associated with stressors. Based on the previous research, five task dimensions are examined: autonomy, closeness of supervision, complexity, interdependence, and routinization.

The model posits that contextual, role-related, and task variables are independently related to variations in the magnitude of the seven stressors. This general postulate is derived from the theoretical perspectives underlying the model (Kahn et al., 1964; Katz & Kahn, 1966; McGrath, 1976). Although the three sets of antecedent variables are regarded as conceptually distinct in the model, it is recognized that in practice there is some overlap among these elements (Katz & Kahn, 1966; Perrow, 1970; McGrath, 1976). Analytically, the distinction is useful, and it is possible to assess the contribution of each category separately through the use of appropriate statistical techniques. In order to test the relationships postulated in the model, specific hypotheses are proposed concerning the association of each component antecedent variable with the seven stressors.

Theory and empirical research on the effect of functional specialization on job perceptions (Katz & Kahn, 1966; Herman et al., 1975; Adams et al., 1977) suggest that subsystem should be related to meaningful differences in the perceived magnitude of different stressors. Thus it is hypothesized that:

> *H1. Subsystem, controlling for shift and job level, will be significantly related to variation in the prominence of the seven stressors.*

Variations in sociotechnical characteristics of different subsystems and their internal system dynamic derived from common functions and norms (Katz & Kahn, 1966; Lawrence & Lorsch, 1967) are expected to account for the differential distribution of stressors among the five subsystems. Considering these systemic properties and the nature of the different stressors, some tentative and perhaps speculative corollary hypotheses are offered concerning the pattern of subsystem differences expected. Thus the production subsystems, being motivated by the proficiency dynamic, may be expected to report high levels of stressors entailing resource constraints and obstacles to performance: technical problems, efficiency problems, staff shortages, and short lead times. The prominence of efficiency problems and short lead times may be expected to be highest in the multiproduct production subsystem due to the greater technological complexity of its operations. Conversely, given its primary function of coordination and control, and lack of direct involvement in the production process, the administrative subsystem is expected to report lower levels of all the stressors except that of too many meetings. Insofar as the boundary subsystem performs a linking function and engages in transactional exchanges with the other subsystems, the prominence of interunit conflict as a stressor is expected to be high in this subsystem.

Several studies have reported results indicating differential job perceptions based on shift assignments (Pearlin, 1962; Mott et al., 1965; Herman et al., 1975). It is therefore hypothesized that:

> *H2. Work shift, holding subsystem and job level constant, will be significantly related to variation in the prominence of the seven stressors.*

Because the first shift is primarily responsible for start-up of production and implementation of schedules, it is expected that the reported levels of the various stressors will be greater in the first shift than in the second.

The findings of Kahn et al. (1964), Schuler (1977b), and others suggest that job level may be expected to be associated with meaningful differences in the magnitude of the various stressors. Thus it is hypothesized that:

H3. Job level, controlling for shift and subsystem, will be significantly related to variation in the prominence of the seven stressors.

The evidence concerning the direction of the relationship between job level and stressors is equivocal (Kahn et al., 1964; Lichtman, 1970). The findings of Buck (1972), and French and Caplan (1973) suggest, however, that the pattern of differences may depend upon the type of stressor concerned. Insofar as managers and supervisors have overall responsibility for performance and are more likely to have direct dealings with individuals in other departments, it is expected that the reported magnitude of efficiency problems, short lead times, too many meetings, and interunit conflict will be greatest in the high job level group. Correspondingly, the stressors of technical problems, staff shortages, and role frustration are likely to be more prominent among those in nonsupervisory positions, that is, the middle and low job level categories.

Previous research (Hall & Lawler, 1970; Brief & Aldag, 1976; Rogers & Molnar, 1976) suggests that task characteristics may be differentially related to the importance of various stressors. Buck (1972) advanced the idea that it is the element of lack of control that contributes to the perception of particular situations as potential stressors. Jobs allowing individuals little freedom and discretion, thereby circumscribing their ability to deal with environmental stressors, may therefore be expected to be associated with higher reported levels of different stressors. Thus closeness of supervision and routinization are likely to be positively related to the seven stressors. To the extent that job complexity entails difficulty in task accomplishment, it may be expected to bear a positive relationship with the different stressors, especially those posing obstacles to performance—technical problems, efficiency problems, staff shortages, and short lead times. Insofar as task interdependence reduces individual flexibility in dealing with different situations, this task attribute also may be expected to be positively related to the seven stressors. Thus, it is hypothesized that:

H4. The task characteristics of complexity, closeness of supervision, interdependence, and routinization will be positively related to the seven stressors.

In contrast, the task attribute of autonomy may be expected to be inversely related to the stressors due to the latitude it provides individuals in dealing with complex work demands. It is therefore hypothesized that:

H5. The task characteristic of autonomy will be negatively related to the seven stressors.

METHOD

Sample and Site

The data for this research were obtained from organizational records and a questionnaire survey of employees of a medium-sized food processing firm. Operating on a production-to-order system, the company manufactures and distributes a wide variety of products under private labels to a large number of customers. This mode of operation results in considerable day-to-day fluctuations in the volume and content of production and distribution activities. The questionnaires were administered at the work site and completed by 217 persons, representing 86 percent of the membership of the organization. Of the respondents, 67 percent were male and 33 percent female. The average age of the subjects was 38 years, and their average tenure in the organization was 7.3 years.

Measures

Subsystem—Adapting Katz and Kahn's (1966) scheme of generic types of subsystems, the authors and two other judges grouped the 17 departments in the organization into 5 subsystems based on commonalities in their basic organizational functions and their role in relation to the production cycle.

(1) Administrative subsystem ($n=32$)—the "management group," personnel department, and general office staff involved in managerial and administrative functions;
(2) Production subsystem I ($n=64$)—production departments engaged in manufacturing a single product, of limited variety;
(3) Production subsystem II ($n=34$)—production departments processing many varieties of different products;
(4) Technical support subsystem ($n=44$)—departments providing maintenance, quality assurance, and sanitation services;
(5) Boundary subsystem ($n=43$)—departments engaged in the supply and/or movement of materials and finished products within and without the organization.

The two-fold classification of production departments into single-product and multiproduct subsystems was based on an a priori assumption of technological differences between the two in terms of complexity of operations.

Shift—This contextual variable included two categories—first and second shift. Not all the departments were operating on two shifts at the time of the survey. Furthermore, the third shift partially overlapped with the second shift and included only 12 individuals working in the sanitation department. For the purposes of this study, therefore, individuals in the third shift were grouped together with those in the second shift.

Job level—An organizational perspective was taken in operationalizing job level. The organization's ratings of the vertical dimensions of jobs, based on education required or training time as well as responsibility and authority, were used to assign individuals into three job level categories—one managerial/supervisory level and two nonsupervisory levels:

(1) High level ($n=38$)—all managers and supervisory personnel;
(2) Medium level ($n=95$)—for example, computer technicians, salesmen, senior secretaries, group leaders, machine operators, cooks, maintenance mechanics, and tow motor operators;

(3) Low level ($n = 84$)—clerks, utility workers, quality control technicians, machine cleaners, housekeepers, and heavy materials handlers.

This categorization reflects the subject organization's valuation of different positions and recognized status differentials based on job type.

Task Characteristics—The measures of task characteristics were factor analytically derived from a set of items drawn from previous studies (Hackman & Lawler, 1971; Hrebiniak, 1974). Cronbach's (1951) coefficient alpha was used to estimate the internal consistency reliability of the measures. The scale measuring job autonomy consisted of four items, which indicate the amount of say the individual has in setting work goals, determining task priorities, determining the pace of work, and freedom of choice in how to approach the job ($\alpha = .76$). The measure of closeness of supervision includes three items that reflect the extent of supervisory influence on the focal individual's daily work, the frequency of supervisory monitoring of work, and emphasis on standard operating procedures ($\alpha = .67$). Complexity was measured by a 3-item scale reflecting the amount of training required for the job, required communications, and the degree of complexity of the work itself ($\alpha = .71$). Interdependence was measured by two items indicating the extent of dependence of the individual's work on prior task completion by others and the importance of timely completion of the respondent's own job to the work of others. The intercorrelation of the two items was $r = .62$. The measure of routinization consisted of two items ($r = .49$) indicating the degree of repetitiveness of tasks and the extent to which they were governed by rules and regulations.

Job Stressors—The scales measuring potential stressors were constructed through an iterative process from a larger pool of items developed by the authors. The items were based on information gathered from interviews with a cross-section of members of the subject organization (including both supervisory and nonsupervisory personnel) and content analysis of problem situations described by supervisors in their "Stress Reports" over a three-month period. Individuals were asked to indicate the frequency and perceived severity of each event or situation in relation to their own jobs. Both measures were calibrated on a 5-point Likert-type scale, with the response options for frequency going from "almost never" to "almost always" and those for severity from "not at all a problem" to "a severe problem." Separate factor analyses of the frequency and severity responses did not yield unambiguous and conceptually meaningful factors. Because the frequency and severity responses for each item were highly correlated (75 percent over .60), a composite measure of the magnitude of each stressor was arrived at by summing the two parts. The factor solution of the aggregated responses yielded six orthogonal factors cumulatively accounting for 59.3 percent of the variance. In interpreting the factors and forming scales, the criterion applied was to select items that loaded .50 or higher on a given factor and less than .35 on other factors. Item-total correlations were computed to verify the homogeneity of the items selected. Using these procedures, four multiple-item scales and two single item measures were developed. (1) *Interunit conflict* includes four items reflecting various dimensions of conflict such as communication difficulties, lack of interdepartmental cooperation, and overlapping responsibilities ($\alpha = .74$). (2) *Technical problems* consists of three items indicating resource inadequacies in the form of equipment breakdowns, defective materials and supplies, and equipment-related accidents ($\alpha = .68$). (3) *Efficiency problems* is a 2-item scale measuring difficulties in achieving productivity standards and is indicative of qualitative overload. (4) *Role frustration* is a multidimensional measure denoting excessive work load, inadequate supervisory instruction, favoritism by supervisors, and low status ($\alpha = .76$). The common theme underlying these elements is difficulty or frustration in role fulfillment arising from quantitative overload in the face of low control and various situational constraints. (5) *Staff shortages*, operationalized by a single item measure with a factor loading of .64, represents another type of resource inadequacy—human resources. (6) *Too many meetings* as a stressor condition was measured by a single item (factor loading of .83).

Short lead times, which reflects time pressures, was operationalized by a single item in which respondents were asked to indicate the extent to which they encountered "less than standard lead times on jobs." The treatment of this as a separate and distinct source of stress was based on inadequate lead times having been emphasized as a major environmental stressor during the interviews and the special significance and meaning of the term "lead time" to members of the subject organization. The organization had a stated policy requiring a minimum lead time of 10 working days between receipt of an order from a customer and desired date of shipment. Frequent bending of the policy to accommodate customer requests necessitated rescheduling of planned production runs and operating under tight deadlines, which constituted potential stressors to those affected by the schedule changes. The availability of objective data, of deviations from this policy at a departmental level, as a means of verifying perceptual data, provided an additional rationale for examining short lead times as a separate and individual stressor condition. (Analysis of the data revealed moderate correspondence between individuals' perceptions of the severity of short lead times and the mean frequency of occurrence of short lead times in the four production departments over a three-month period immediately preceding the survey.)

A necessary characteristic for any environmental demand, constraint, or event to be regarded as a stressor is its demonstrated ability to produce stress reactions in many individuals (Kahn & Quinn, 1970). Recognizing this, the propensity of the seven stressors to engender psychological strain and other attitudinal and behavioral reactions was established through preliminary correlational analysis. The results showed the seven stressors to be significantly positively related to felt stress ($r = .18$ to $.55$), and negatively related to measures of job satisfaction ($r = .17$ to $.52$) and organizational commitment ($r = .16$ to $.35$). Some of the stressors showed weak to moderate relationships with performance ($r=-.14$ to $-.20$) and turnover ($r=.11$ to $.16$). (Details are available from the first author.)

Data Analysis

Multivariate analysis of covariance (MANOVA) was performed to ascertain the relationships among the sets of predictor variables and to determine the effect of subsystem, shift, and job level on the seven stressors. A 5×3 factorial design was employed with work shift as the covariate and subsystem and job level as the two factors. The treatment of shift as a covariate instead of as the third factor was dictated by limitations of the data set. There were insufficient numbers of subjects falling into each cell of the design ($5\times3\times2=30$) created by considering shift as a third factor. Finn's (1974a) multivariance program, which has built-in techniques for dealing with unequal cell sizes, was used to perform the analysis of covariance. The technique of Multiple Classification Analysis (MCA) (Kim & Kohout, 1975) was utilized for interpreting the MANOVA results and measuring the independent contributions of subsystem, shift, and job level to variation in the different stressors. Correlation analysis using pooled within-group correlations was used to assess the pattern of associations between task characteristics and stressors, controlling for the effects of subsystem, job level, and shift. If a data set contains distinct subgroups of subjects with different means on the various measures, valid dispersion measures cannot be obtained by treating the sample as a single group. It is necessary in such cases to calculate separate subclass variances and covariances, or pooled within-group measures. The pooled within-group correlations are derived from the common within-group matrix, which is a weighted average of the variances and covariances for each subgroup. If the subgroup matrices differ, the pooled within-group matrix correctly averages the differences. The degree of bias entailed in ignoring subgroup structure depends on the magnitude of differences among subgroup means (Finn, 1974b).

RESULTS

The relationships of the contextual and role-related variables—subsystem, shift, and job level—with task variables are illustrated by the analysis of covariance results. The significant effects found for subsystem and job level on several task characteristics suggest the presence of both horizontal and vertical differences in task design. Work shift appears to be unrelated to any of the task dimensions. Subsystem variations are noted for all five task characteristics. The univariate *F* ratios of these measures are: autonomy, $F=9.90$ ($p<.001$); closeness of supervision, $F=2.42$ ($p<.05$); complexity, $F=3.99$ ($p<.01$); interdependence, $F=5.46$ ($p<.001$); routinization, $F=3.34$ ($p<.01$). Examination of the cell means presented in Table 1 reveals that compared with the other subsystems, the administrative subsystem is characterized by higher levels of job autonomy and complexity and is markedly lower on the dimensions of closeness of supervision and routinization. Task interdependence is highest in the boundary subsystem. Closeness of supervision is reported to be high in both the production subsystems, and complexity and interdependence are higher in the multiproduct production subsystem than in the single-product production subsystem. The direction and nature of these differences are generally congruent with what one would intuitively expect. The homogeneity of perceived task characteristics within different subsystems provides some verification of the appropriateness of the subsystem classification.

Job level is significantly related to three task dimensions: autonomy, $F=26.89$ ($p<.001$); complexity, $F=26.78$ ($p<.001$); interdependence, $F=4.89$ ($p<.01$). The data in Table 1 show that these task characteristics are all markedly higher in the high job level group than in the other two job levels. These differences also are in the expected direction and are consonant with previous findings that positions at higher levels tend to possess more of the characteristics of "enriched" jobs (Hackman & Lawler, 1971).

The relationship of subsystem, shift, and job level on the seven stressors was assessed by means of multivariate analysis of covariance. The MANOVA results confirm Hypotheses 1 and 3, and show that subsystem ($F=4.80, p<.001$) and job level ($F=5.71, p<.001$) independently contribute to variation in the perceived magnitude of stressors. The overall effect of work shift on job stressors was only marginally significant ($F=2.45$, $p<.054$), thus providing partial support for Hypothesis 2. The data in Table 2 reveal significant main effects for both subsystem and job level with regard to five of the seven stressors—technical problems, efficiency problems, role frustration, short lead times, and too many meetings. The covariate shift was significantly related to the stressors of short lead times and too many meetings, and a significant interaction effect (subsystem × skill level) was observed for the stressor of staff shortages.

The MCA results presented in Table 3 summarize the net and total effects of subsystem and job level on different stressors. The beta values represent partial regression coefficients and indicate the independent (net) effects of subsystem and job level respectively on stress sources. The R^2 values indicate the proportion of variance in stressors explained by the additive effects of subsystem, shift, and job level. The figures show that subsystem and job level together account for a substantial proportion of the variation in technical problems ($R^2=.21$), though the individual contribution of subsystem ($\beta=.45$) is markedly greater than that of job level ($\beta=.16$). Subsystem also impacts somewhat more strongly on efficiency problems ($\beta=.27$) as compared with job level ($\beta=.16$). Subsystem and job level make approximately equal contributions to the stress conditions of role frustration, short lead times, and too many meetings.

The MANOVA results indicate that, overall, there is greater variation in the magnitude of stressors among subsystems and job levels than there is

TABLE 1
Cell Means of Task Variables by Subsystem and Job Level

	Subsystem					Job Level		
Task Variance	*Administrative*	*Production I Single Product*	*Production II Multiproduct*	*Technical Support*	*Boundary*	*High*	*Medium*	*Low*
Autonomy	14.75	10.06	11.00	12.59	14.23	16.16	12.04	11.02
Closeness of supervision	8.37	10.15	10.28	9.84	10.37	9.00	10.16	10.04
Complexity	11.66	8.41	9.91	10.61	9.77	12.05	10.86	8.57
Interdependence	7.12	6.44	7.14	6.43	8.30	7.79	7.37	6.52
Routinization	6.62	7.59	7.52	7.36	8.16	7.10	7.53	7.63

TABLE 2
Analysis of Covariance Results for Stressors: Subsystem and Job Level, Controlling for Shift

		Dependent Variables: Stressors						
		Interunit Conflict	*Technical Problems*	*Efficiency Problems*	*Role Frustration*	*Staff Shortages*	*Short Lead Times*	*Too Many Meetings*
Source of Variation	*df*	*F*	*F*	*F*	*F*	*F*	*F*	*F*
Covariate: shift	1	3.69	.004	.05	1.99	.38	4.76*	4.70*
Subsystem	4	.54	10.76***	4.15**	3.54**	1.01	2.94*	3.78**
Job level	2	2.41	3.30*	4.01*	5.41**	.36	3.92*	4.92**
Subsystem × Job level	8	1.04	.98	1.43	.54	2.26*	.79	.35
Error	202							

*$p < .05$
**$p < .01$
***$p < .001$

TABLE 3
Multiple Classification Analysis: Independent and Joint Contributions of Subsystem and Job Level to Variation in Stressors, Controlling for Shift

	Net Effect				
	Subsystem		*Job Level*		
Dependent Variables	*Beta Adjusted for Job Level*	*Beta Adjusted for Job Level and Shift*	*Beta Adjusted for Subsystem*	*Beta Adjusted for Subsystem and Shift*	*Total Effect* R^2
Interunit conflict[a]	.09	.10	.15	.15	.05
Technical problems	.45	.44	.16	.16	.21
Efficiency problems	.27	.27	.19	.19	.10
Role frustration	.23	.26	.22	.22	.13
Staff shortages[a]	.13	.13	.06	.06	.02
Short lead times	.20	.24	.21	.20	.07
Too many meetings	.24	.28	.23	.22	.10

[a] Main effect not significant.

within these membership categories. Cell means (Table 4) were examined to determine the locus and pattern of these differences and to ascertain whether they were congruent with the tentative hypotheses made about the differential distribution of stressors. The expectation that the prominence of technical problems, efficiency problems, role frustration, and short lead times will be low in the administrative subsystem was substantially confirmed. Contrary to expectations, the stressor of too many meetings was reported to be lower in the administrative subsystem than in the other four subsystems. The data support the predictions that the magnitude of technical problems will be high in the two production subsystems and that the prominence of efficiency problems will be highest in the multiproduct production subsystem. The high levels of role frustration and the stressor of short lead times reported by the technical support subsystem were not expected.

The observed differences in the magnitude of stressors by job level confirm the expectation that efficiency problems, short lead times, and the stressor of too many meetings would be prominent in the high job level category. The high levels of technical problems and role frustration reported by the medium and low job level groups are similarly congruent with expectations. No differences were found in the magnitude of interunit conflict and staff shortages among job levels.

Variation in the importance of different sources of stress between the two shifts was limited to short lead times and too many meetings. As expected, both of these stressors were reported to be more severe in the first shift than in the second shift.

The finding of intergroup differences in task characteristics and job stressors indicated that the use of correlations based on sample means would be inappropriate and yield biased results concerning the relationships between task variables and stress conditions. The pooled within-group correlations computed to control for subsystem, shift, and job level

TABLE 4
Cell Means of Stressors by Subsystem and Job Level

	Subsystem					Job Level		
Stressors	*Administrative* *N*=32	*Production I Single Product* *N*=34	*Production II Multiproduct* *N*=64	*Technical Support* *N*=44	*Boundary* *N*=43	*High* *N*=38	*Medium* *N*=95	*Low* *N*=84
Interunit conflict	19.16	18.47	18.33	19.45	19.60	19.34	19.98	17.88
Technical problems	10.50	16.24	15.89	15.45	14.93	13.63	15.69	14.50
Efficiency problems	9.34	9.21	11.22	9.77	10.28	10.74	10.45	9.54
Role frustration	15.16	17.18	17.89	20.95	17.09	14.42	19.21	17.83
Staff shortages	4.84	4.59	4.97	5.30	5.20	5.18	5.01	4.92
Short lead times	4.38	4.85	4.66	5.27	4.54	5.37	4.71	4.51
Too many meetings	2.53	2.79	3.16	3.21	3.23	3.53	2.93	2.93

TABLE 5
Correlations of Task Variables with Stressors (Adjusted for Subsystem, Shift and Job Level)

		Stressors						
Task Variables	*df*	*Interunit Conflict*	*Technical Problems*	*Efficiency Problems*	*Role Frustration*	*Staff Shortages*	*Short Lead Times*	*Too Many Meetings*
Autonomy	208	-.02	-.01	-.01	-.20**	-.01	.03	-.01
	215	(.05)[a]	(-.15*)	(.03)	(-.22***)	(.03)	.09	.09
Closeness of supervision	208	.12*	.19**	.13*	.12*	.08	.12*	.09
	215	(.13*)	(.28**)	(.16**)	(.16**)	(.11*)	(.13*)	.01
Complexity	208	.19**	.20**	.21**	.18**	.11*	.10	.05
	215	(.24***)	(.10)	(.22***)	(.11*)	(.11*)	(.13*)	(.11*)
Interdependence	208	.06	.16**	.21**	.05	.03	.01	.06
	215	(.02)	(.15*)	(.25***)	(-.01)	(.04)	(-.02)	(.09)
Routinization	208	.10	.09	.13*	.16**	.12*	.05	-.10
	215	(.11*)	(.14*)	(.14*)	(.17**)	(.15*)	(.06)	(-.05)

[a] Figures in parentheses are correlations based on unadjusted sample means.
*$p<.05$
**$p<.01$
***$p<.001$

show the range of correlations among the task characteristics to be .05 to .26 and the average interitem correlation to be .15. Table 5 presents the pooled within-group correlations between the five task dimensions and the seven stressors. The results show that Hypothesis 4, which predicted that closeness of supervision, complexity, interdependence, and routinization will be positively related to all the stressors, receives mixed support, with only 14 of the 28 correlations significant. Furthermore, the magnitude of the correlations is small, with only four reaching .20. Job complexity is positively related to four stress conditions: interunit conflict ($r = .19$, $p < .01$), technical problems ($r = .20$, $p < .01$), efficiency problems ($r = .21$, $p < .01$), and role frustration ($r = .19$, $p < .01$). Closeness of supervision is significantly, though weakly, correlated with interunit conflict ($r = .12$, $p < .05$), technical problems ($r = .19$, $p < .01$), efficiency problems ($r = .13$, $p < .05$), role frustration ($r = .20$, $p < .01$), and short lead times ($r = .12$, $p < .05$). Interdependence correlates .16 ($p < .01$) with technical problems, and .21 ($p < .01$) with efficiency problems. Routinization is positively associated with efficiency problems ($r = .13$, $p < .05$), role frustration ($r = .17$, $p < .01$), and staff shortages ($r = .13$, $p < .05$). The data in Table 5 show that autonomy is related to only one of the seven stressors—role frustration ($r = .20$, $p < .01$)—thus providing negligible support for Hypothesis 5, which predicted that this task attribute would bear a significant negative relationship with all the stressors.

DISCUSSION

In this paper an integrated, systems framework was utilized to examine different types of stressors generated in the work environment and to determine the impact of antecedent contextual, role-related, and task variables on such sources of stress. The seven stressors identified reflect resource inadequacies with regard to materials, equipment, personnel, qualitative overload, time pressures, intergroup conflict, and quantitative overload, in conjunction with situational constraints. The contextual and role-related variables of subsystem and job level, respectively, were found to be significantly and independently related to the reported magnitude of five of the seven stressors. This indicates that both horizontal and vertical differentiation constitute important organizational referents for individuals' perceptions of their work situation and are meaningful sources of variation in the prominence of different stressors. These findings confirm the results of previous research demonstrating the importance of structural elements in shaping individuals' job perceptions and attitudes (Herman et al., 1975; Adams et al., 1977). The expectation that shift assignments also would be associated with differential levels of the various stressors was only partially confirmed. This equivocal result may have been caused by the manner in which the dimension of work shift was operationalized.

The results of the multiple classification analysis suggest that subsystems or common work functions have a somewhat stronger effect than does job level on the reported magnitude of stressors, particularly technical problems and efficiency problems. The pattern of subsystem variations in the levels of different stressors is, with some exceptions, generally consistent with expectations and reflects both functional differences and variations in technology and perceived task characteristics. Compared with the four production-related subsystems, the administrative subsystem reported markedly lower levels of the stressors of technical and efficiency problems, short lead times, and role frustration. Inasmuch as the administrative subsystem was not directly involved in the production process, its activities were likely to entail little use of machinery and equipment and would not be subject to explicit productivity criteria. Thus the low prominence of these stressors is reasonable. The higher job autonomy and lower levels of routinization and closeness of supervision found in this subsystem are also likely to enable its members to deal more effectively with various stressors. The reported magnitude of technical problems in the two production subsystems reflected their concern for meeting production requirements in the face of low operational flexibility arising from assembly-line operations, tight supervision, high routinization, and low autonomy. The greater complexity of operations involved in manufacturing a variety of products may account for the perceived magnitude of efficiency problems in the multiproduct production subsystem.

The data in this study reveal systematic differences in the pattern of stressors across job levels. For managers and supervisors, who comprise the high job level group, the principal stressors were those indicative of qualitative overload and time constraints, that is, efficiency problems, short lead times, and too many meetings. The perceived magnitude of these stressors reflects the relatively greater responsibility of managers and supervisors for adhering to performance standards in terms of achieving targeted productivity levels and meeting explicit time constraints. These findings support the idea that individuals at higher levels encounter stress more often due to responsibility for people (the work of others) than as a result of responsibility for things (French & Caplan, 1973). In contrast, in this study, for individuals in middle and lower level positions, role frustration and technical problems were the major sources of stress—stressors reflecting quantitative overload, low status, and inadequate supervisory instruction and impediments to task accomplishment in the form of technical resource inadequacies. These results parallel Buck's (1972) findings that for workers, the salient stressors pertained to elementary components of their job, such as insufficient parts and materials, and difficulty in staying caught up with the volume of work, whereas managers tended to be more stressed by factors impinging on responsibility for production and quality.

This study suggests that there is a large measure of homogeneity in the perceived work experiences of individuals *within* particular membership categories. The data suggest that functional similarity, and commonalities in the task environment and role responsibilities are importantly related to the prominence of different stressors. A knowledge of the subsystem and job level to which an individual belongs thus is a key factor in understanding the type and perceived magnitude of stressors encountered in the work situation.

It is evident from these findings that failure to consider and control for intergroup differences in encountering various sources of stress could be a potentially confounding factor in the relationships between stressors and other variables of interest. This is illustrated by the observed differences in the correlation coefficients between task variables and different stressors based on unadjusted sample means and those derived from pooled within-group measures (Table 5). The expectation that task characteristics would constitute a major source of variation in the level of different stressors was only partially fulfilled. Autonomy was found to be unrelated to any stress condition except role frustration. A tentative explanation for this is that autonomy may affect stress situations only indirectly, mitigating their severity through the greater latitude and control that it provides individuals. Although the correlations of the other task dimensions with stressors are generally in the expected direction and several are statistically significant, the overall magnitude of the associations tended to be low. This may be due in part to the functional and role differences among subsystems and job levels which subsume variations in task attributes. Measurement errors and the possibility that other task attributes not included in this research such as skill-variety, task identity, and task significance are more relevant to the stressors examined, may be additional explanatory factors.

Extant research in the area of stress shows no prior attempt to investigate, concurrently, contextual, task, and role-related variables as determinants of the importance of different stressors. The findings reported in the present study indicate that multiple facets of the work environment are salient to an understanding of the nature and antecedents of work-related stressors. In interpreting the results of this research, however, it should be noted that the analytical techniques used do not permit the drawing of causal inferences about the relationship between organizational characteristics and the different stressors. Given the use of self-reports to measure many of the variables in the study, the possibility also exists that common method variance may account for some of the observed results. The use of independent measures of organizational characteristics as well as multiple ratings of stressors in future studies would serve to provide a better understanding of both the objective and "psychological" environment of organizations. Such research also should identify and measure the key elements of subsystem dynamics and the specific characteristics of roles at different organizational levels that contribute to stress conditions at work.

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A Conceptual Paradigm and Approach for the Study of Innovators[1]

WILLIAM J. BIGONESS
WILLIAM D. PERREAULT, JR.
University of North Carolina at Chapel Hill

An operational approach for measuring an organization's innovativeness is proposed. This procedure draws on measurement theory to overcome problems often associated with single product and composite measures of innovativeness. A criterion variable is used to test the relationship between selected organizational characteristics and firm innovativeness. Firms possessing internal technical expertise were found to be more innovative than firms without such expertise.

The past decade has witnessed an increasing interest in the process of technological diffusion and the characteristics of innovative organizations. This attention, by researchers from diverse disciplines, is understandable for numerous reasons. At the macro level, the rate of innovation and technological change affects such important social concerns as inflation, productivity, competition between industries, and the international competitiveness of a nation's products (Utterback, 1975). From a micro perspective, the increasing turbulance and competitiveness of organizations' environments have made the identification, evaluation, and adoption of technological innovations a critical determinant of organizational performance (Zaltman, Duncan, & Holbeck, 1973). From a different perspective, organizations that develop and market innovations need to identify early potential adopters, for they often determine the initial success or failure of new products and services.

For the reasons cited above, there exists a broad interest in the process of innovation. However, present knowledge and understanding of the innovation process remains at a relatively undeveloped state. Despite the

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publication of more than 2,400 studies concerning the topic of innovation (Rogers & Eveland, 1975), findings frequently have been either inconclusive or contradictory. As Downs and Mohr (1976) have noted, factors found to be important for one innovation in one study are found to be considerably less important, not important at all, or even inversely important in another study.

In light of the current state of innovator research, this paper seeks to meet several related objectives. First, it presents an integrative conceptual paradigm for the study and measurement of innovators. This paradigm clarifies some of the inconsistencies found in earlier studies and offers a framework for future research. Second, based on this framework, an operational approach to the development of a valid measure of innovativeness is suggested. Finally, an illustrative study applying the approach is presented, along with an empirical evaluation of the applicability of the criterion measure.

THEORETICAL ISSUES

Insights from Diffusion Theory

The issues of identifying and evaluating innovative organizations are complex, but insights may be gained by considering innovativeness from the broader context of diffusion theory. In his landmark book, Rogers (1962) provides a theory that suggests that the diffusion process is influenced by the nature of four major, interrelated constructs: (1) the innovation(s), (2) the relevant social systems, (3) time, and (4) communications about the innovation. The innovation may be a process, idea, concept, product, or set of these which is newly available to (potential) adopters. Although this paper sometimes refers to innovative "products," this term is intended to include other generic types of innovation as well. The social system includes organizations (individuals, firms, industries, countries, or the like) that are potential adopters of an innovation and other organizations with which they interact. Because diffusion and the adoption of innovations are temporal processes, variations due to the time dimension need to be explicitly considered. Finally, communications about the innovation may be informal or formal, and how they are transmitted and processed impacts the rate of acceptance of new products. The role of communication interacts with and is moderated by the other three more basic constructs. Thus, variations in any of these factors may impact the extent and rate of diffusion as well as the nature of organizations which should be classified as innovators. Substantially more detail concerning these constructs and the general propositions noted above has been provided by Rogers (1962) and Rogers and Shoemaker (1971). Therefore, it is neither necessary nor desirable to repeat that material here. Rather, attention is focused primarily on those aspects of diffusion theory that are most directly related to this work.

From both a general conceptual perspective and the more specific research perspective, one of the most important implications of Rogers' theory is that it explicitly recognizes that diffusion of innovations and the concurrent innovativeness of organizations are *relative* constructs. For example, what is a rapid rate of diffusion for one type of innovation (i.e., a continuous, dynamically continuous, or discontinuous innovation) may be a very slow rate of diffusion for another type of innovation (Robertson, 1967). In the same vein, innovators in one social system may be viewed as late adopters or even laggards in other social systems. Thus, identification of an organization as innovative is relative to the innovation, the time frame, and the relevant social system. Yet, researchers interested in the innovation process have utilized widely differing frames of reference by which to assess innovativeness. Frequently the major constructs noted above have not been explicitly considered or specified.

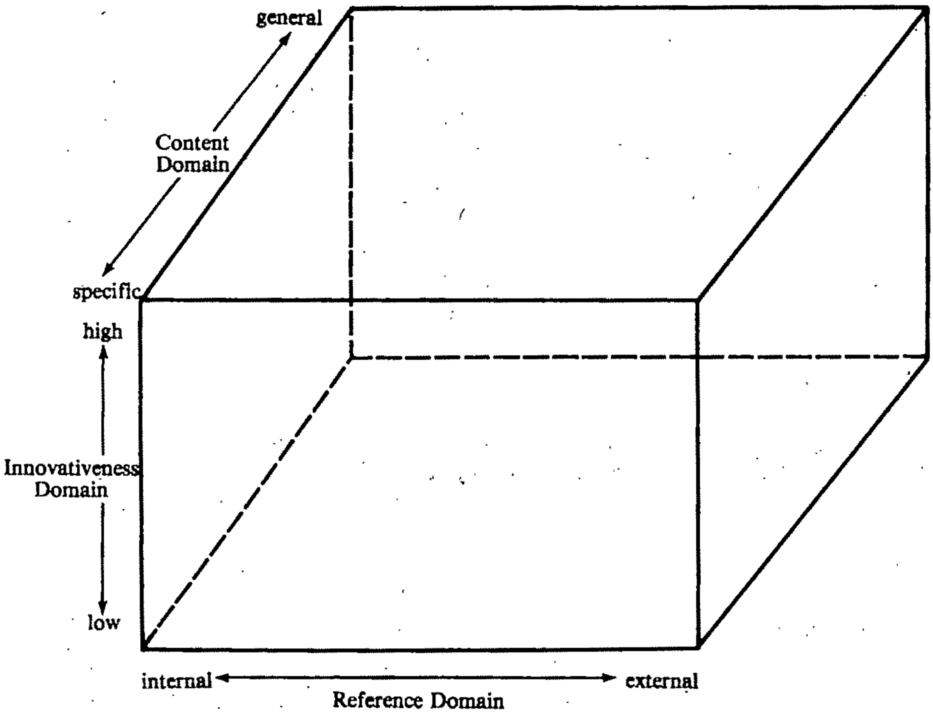
The Conceptual Framework

If, as suggested above, innovativeness is a relative construct, it is important to (1) conceptualize innovativeness as a relative phenomenon and (2) to specify the dimensions that explicitly or implicitly characterize relative innovativeness. Toward this end, Figure 1 provides a schematic representation of a three dimensional conceptualization of innovativeness. The dimensions of this figure may be thought of as a set of axes, with each organization positioned in the grid based on its coordinates along the three axes. The three axes represent the *content domain* of an organizations' innovativeness, the *reference domain* for that innovativeness, and the *innovativeness domain* with respect to the other axes. These different dimensions are discussed below.

The vertical dimension reflects the innovativeness domain of the organization and is most closely analogous to the traditional characterizations of the level of innovativeness. Operationally, the "score" of an organization on this dimension may be binary (0/1) based on adoption or nonadoption of an innovation at a point in time, or it may be a continuous variable based on either stage of adoption or some form of composite measure. Such measurement considerations are important and will be developed more fully later in this paper. At this point, however, it should be noted that the score of an organization in the innovativeness domain is directly impacted by time (and thus the stage in the broader diffusion process). If the analysis is static in time, the point in time at which data are collected may dictate how innovative the organization is considered to be. For example, at time t a firm may not have adopted an innovation, but at a later time $(t+1)$ another measurement might reveal that the innovation has been adopted. When the analysis is dynamic, the temporal dimension is considered because the focus is on changes in innovativeness (over time).

However, by itself, the innovativeness domain is underspecified. An organization may be innovative in some areas, but not in others. For

FIGURE 1
Schematic Representation of a Conceptual Framework for the Study of Innovators



example, a manufacturing firm may be innovative with respect to a certain production technology which it uses, but it may not be innovative at all with respect to other aspects of production, marketing, or organizational structure. Thus, the second dimension specifies the *content domain* of innovativeness. At one end of this continuum, attention is directed at adoption of very specific innovations (i.e., a single new product or technology); at the other extreme attention is focused on very general types of innovativeness (i.e., new products or approaches across a broad spectrum of content areas). The intermediate points on the continuum reflect the extent to which clusters of relative innovations have been adopted. By specifying and considering the content domain of organizations' innovativeness, explicit consideration is given to Rogers' theory that different types of innovations may result in different diffusion processes. This also helps to explain why a firm characterized as innovative in one study might logically be characterized as noninnovative in another concurrent study concerned with a different, or more general, content domain. It also follows that an organization's general innovativeness will be a function of its innovativeness *across* a number of more specific content areas.

Yet, consideration of the content domain of an organization's innovativeness still does not fully specify the innovativeness construct. The relevant social system must be considered. For example, a foreign manufacturer that uses computer controlled production equipment may be viewed as highly innovative *relative* to other similar firms in its own country, but not with respect to competing firms in the United States. Conversely, it might be viewed as highly innovative when world-wide manufacturers (across industries) are the relevant social system. To consider these issues specifically, the third dimension of the conceptualization proposed here specifies the *reference domain* of an organization's innovativeness. The reference domain identifies the boundaries that are to be used in defining the social system within which a firm's innovativeness will be compared or contrasted.

As is depicted in Figure 1, the reference domain may be thought of as a continuum ranging from "internal" at one end to "external" at the other end. In the case of an internal (micro) orientation, the current innovativeness of an organization (in a specified content domain) is compared to its levels of innovativeness at some earlier time period. That is, the organization serves as its own comparative social system. By contrast, in the more common case, comparisons are with external organizations and tend to be macro and aggregative in nature. By specifying the reference domain, potential inconsistencies are resolved. An organization in the process of change may be innovative relative to its previous posture but may still be a laggard relative to other firms in its industry, or relative to other industries in general.

From a research perspective, this conceptualization is helpful because it is related directly to the sampling design of studies of innovativeness. First, the reference domain specifies the sampling frame for the units of analysis. If, for example, one is concerned with the relative innovativeness of different wholesalers in the power equipment industry, data would be collected across such firms for purpose of comparison. By contrast, if the focus is on the more micro issue of what factors resulted in change in a *given* organization, the sample is specific to that organization and the design is longitudinal.

Similarly, the content domain of innovativeness specifies the types of innovations that will be considered (sampled) in a given study. If a specific form of innovativeness is relevant, the measure of innovativeness may be based on the adoption of a single new product. If more general types of innovativeness are of concern, different potential innovations representative of that content area must be sampled and appropriate composite measures developed.

In summary, the ability to generalize the results of studies of innovators is limited by the reference and content domains that are sampled and their representativeness of other content areas (types of innovations) and reference domains (social systems). The representativeness of the reference domain is a topic that has been the focus of much attention in the general literature on survey sampling. A good review may be found in Kish (1965). The representativeness of the content domain sampled is a function of the procedures used to develop measures of innovativeness. This implies that researchers must evaluate the appropriateness of alternative measures of innovativeness.

Measurement Problems

Both single innovation and multiple innovation studies of the innovation process have been criticized. Studies based on a single innovation criterion have been challenged on the grounds that the adoption of a single innovation may be idiosyncratic and therefore not representative (i.e., neither a valid nor reliable measure of innovativeness in general). On the other hand, studies that have employed traditional composite scores of innovativeness (Mohr, 1969; Walker, 1969) have been challenged on the grounds that this practice implicitly and inappropriately assumes that different innovations are homogeneous (Downs & Mohr, 1976). From the perspective of the conceptual framework provided here, homogeneity is with respect to the content domain that the researchers intend to sample and study.

In response to criticisms of using multiple innovation measures, Downs and Mohr (1976) advocate as an alternative the use of an innovation decision design that considers the unit of analysis to be the organization *in relation to* the innovation. This perspective has merits, but it is not without limitations from a research standpoint. In many cases it is difficult (if possible at all) to get sufficient data to understand fully the idiosyncrasies of an organization relative to the innovativeness of a product or process. Consequently, such an approach involves subjectivity that may be difficult to operationalize or replicate with reliability.

When considered from the perspective of the conceptual paradigm discussed earlier, it may be seen that each of these different points of view is valid but not necessarily applicable in all situations. For example, a single product criterion of innovativeness is appropriate if one is concerned with identifying innovativeness *only* with respect to that highly specified content area. Alternatively, if a more general aspect of innovativeness is the subject of investigation, it is better to *sample* adoptions of multiple products or activities potentially representative of that content domain so that the reliability and validity of the innovativeness measure may be evaluated, and so that the homogeneity and representativeness of the items sampled may be appraised.

As another example of the unifying aspects of this conceptualization, reconsider the type of situation suggested by Downs and Mohr (1976). If the research is focused on micro analysis of internal organizational change, then the organization itself is the reference set. In such circumstances, the focus of investigation is typically a very specific area of innovation. Under such circumstances the depth and perspective of a case study type of analysis is very desirable, and the scientific process is directed by inductive logic.

On the other hand, more commonly in research studies, the reference set of concern reaches beyond the boundaries of an individual organization. For example, much research has been directed at evaluating differences among innovative and laggard firms in various industries. Such research, based on external reference sets and more general content domains, can provide the strongest basis for making inferences about innovativeness. These situations provide the most appropriate contexts for using statistical models in making deductive statements about differences between innovators and noninnovators. Because this is a particularly important type of research situation for the study of innovativeness, the remainder of this paper focuses on innovativeness measurement in this context.

A Measurement Approach

The measurement procedure proposed in this study is an attempt to develop a reliable and valid composite criterion measure of innovativeness that is consistent with the conceptual issues raised above and that is adaptable to a variety of research settings. It is based on the adoption of multiple products, thus overcoming the common criticisms of single criterion approaches. However, the procedures used in developing the composite innovativeness measure address the concerns of nonhomogeneity and representativeness raised with respect to previous multiple criterion composite scores. Toward these objectives, it is suggested that innovativeness criterion scores be developed by generalizing from item-scale analysis procedures developed by psychometricians in the context of tests and measurement. Cronbach (1970) provides a good overview of the theory and methods of item analysis.

By way of brief review, item analysis procedures evolved as quantitative psychologists attempted to develop standardized (comparative) tests to measure individual's aptitudes, knowledge, or attitudes. As a starting point, each instrument (test) consists of an initial pool of statements or questions with fixed response options (e.g., right vs. wrong, agree vs. disagree). Items are selected to *represent* different component portions of the overall cognitive construct to be measured. The analysis is designed to evaluate the relationship of each item to all other items and to the total test score. This makes it possible to determine if the item does in fact contribute to the quality of the overall scale.

Item analysis procedures generalize directly to the current problem of developing a measure of innovativeness. By analogy, the initial item pool should consist of innovations sampled from and representative of the content domain under consideration. The dichotomous "responses" are the indications of whether or not the innovation has been adopted by the organization by a specified point in time.

The logic of item analysis procedures and their relevance to the conceptual paradigm presented earlier is best clarified by considering an illustrative study. Thus, in the following section the research setting and hypotheses for such a study are described, and then the specific measurement procedures and analysis for that study are presented.

AN ILLUSTRATIVE STUDY

Research Setting and Hypotheses

In the past decade the American shoe industry has been in a turbulent state, and foreign manufacturers have been increasingly successful in penetrating American shoe markets. This has had a negative impact on profits and unemployment in domestic firms and has resulted in an outflow of American dollars. It has been argued that these problems can be countered at least partially by improving the manufacturing capability and cost structure of American firms and, as a result, their price competitiveness and posture in the marketplace. Although improved manufacturing technologies are available to the industry, many firms have not adopted these technologies and thus have not achieved desired gains. As a result, a study was designed to identify manufacturing innovators in the American shoe industry, determine how they differed from noninnovators, and suggest what could be done to speed the diffusion of innovations to the laggard firms. The data discussed in this paper are drawn from this larger study. The specific analysis presented here is designed to test three related hypotheses. First, *it is predicted that firms that possess an internal technical group are more innovative in their manufacturing procedures than are firms that do not have such a unit.* Second, *it is hypothesized that firms that employ managers with engineering expertise in nonengineering managerial positions are more innovative in manufacturing than are firms that do not possess such technical managerial expertise.* Finally, *an additive effect is predicted such that the most innovative firms have both an internal technical group and technically trained managers but firms that possess neither characteristic will be least innovative.*

These hypotheses are developed based on previous research that suggests that most stimuli for innovation originate external to the organization's boundary (Myers & Marquis, 1969; Langrish, Gibbons, Evans, & Jevons, 1972). This research also suggests that firms that possess open communication networks relative to their environments are more likely to adopt innovations than are firms that maintain more closed communication systems (Rogers & Shoemaker, 1971; Zaltman et al., 1973). More specifically, Carter and Williams (1957) noted that if a firm is to make rapid and effective use of scientific ideas, it must include people capable of evaluating or interpreting these ideas in accordance with the needs of the firm. Similarly, Baker (1971) and Olsen (1974) found that firms that possessed a special engineering group responsible for evaluating new technologies were more likely to be innovators than were firms that did not have such a specialized department. Carter and Williams (1959) also found that firms that employed scientists and engineers in nonscientific managerial positions were more innovative than were firms that did not possess such technical expertise within their managerial staff.

Research Methods

As suggested above, the reference domain for innovativeness in this study consists of the social system of domestic footwear manufacturers. To develop a comparative analysis that would be generalizable, 50 firms were randomly selected from this industry, after stratifying for geographic location and size. On both geography and size the firms were representative of the population of interest. Data for the study were collected by personal interviews conducted with top executives identified as key decision makers in the capital acquisition process of the firms.

Respondents were asked to indicate (1) whether or not their company had an autonomous internal technical group and (2) whether or not their company had line managers employed in nonengineering positions who possessed engineering expertise based on previous training or experience. These two variables served as dichotomous independent variables in the analysis.

To develop a criterion composite measure of the manufacturing innovativeness for the firms from this reference domain, it was necessary to identify an array of new products (machine technologies) currently available to domestic footwear manufacturers that were potentially representative of innovativeness in the manufacturing content domain. To identify these products, interviews were conducted with equipment suppliers, footwear producers, and engineering consultants. Based on these interviews, 12 separate machine procedures were identified. The decision makers in the firms were asked to indicate whether or not their companies had adopted each of these products in their manufacturing.

Analysis

The analysis began with development of the criterion measure and was guided by traditional item analysis methods. First, the sample of firms was randomly split into two groups: a measure *development* subsample consisting of 20 firms and a holdout *evaluation* subsample consisting of the remaining 30 firms. Then the frequency of adoption of each of the products was computed for the firms in the scale development subsample. Machines that had been adopted by all firms or none of the firms were deleted from the initial set. This is logical from the perspective of the conceptual framework and from a measurement perspective. Specifically, in the time frame relevant to the diffusion of such machines, and in the reference domain of domestic footwear manufacturers, adoption (or nonadoption) of these machines does not discriminate between innovators and noninnovators. Of the initial 12 innovations, 2 were eliminated based on this criterion.

Correlations then were computed for the remaining 10 innovations to determine the extent to which the adoption of one innovation was positively related to (representative of) the adoption of each of the other innovations. The logic followed here was that any innovation that had an adoption status in the subsample that was inverse to the adoption pattern of other potential innovations was inconsistent with other elements in the content domain and in fact would violate the implicit homogeniety assumption. Moreover, such negative correlations would suggest that laggard firms were adopting the procedure or that it was a minor or evolutionary innovation that was a substitute for a major innovation from the *specified* content domain.

The six innovations remaining after this criterion was applied were used to compute a summative innovativeness scale. This scale then was *evaluated* for reliability and internal validity with firms from the *holdout* sample. Table 1 presents a summary of the statistics relevant to this analysis.

The pattern of correlations in Table 1 is informative. The interproduct correlations are all positive, but they are not inordinately large. Thus, the innovations are neither directly complementary nor generally adopted as sets. Rather, they are each distinct avenues toward manufacturing innovativeness and representative of this broader content domain.

In combination, these patterns suggest that no single innovation is a close surrogate for any of the others. Yet, when taken in combination they depict a generalized pattern of innovativeness in manufacturing. In addition, as might be expected from this pattern, the subset of the machines on which the total innovativeness score is based is internally consistent. Specifically, the Kudar-Richardson (1937) KR-20 estimate of reliability is .68. Such a measure of reliability indicates that the innovations are in fact homogeneous. Therefore, the major criticisms of using a multiple innovation composite scale are explicitly tested and overcome in a fashion that is consistent with and directed by the conceptual framework.

There also is evidence that each of the machines contributes to the internal discriminant validity of the composite scale. The discrimination index (Guilford, 1956) for each product is shown in Table 1. This index is computed as the percentage of holdout firms that adopted a product among those scoring in the top third of the total innovativeness scale score minus the percentage that adopted the product among those firms scoring in the bottom third. Thus, the discrimination index reflects the differential rate of adoption of a particular machine between those who tend to be innovative and those who tend to be laggards, and the larger the index the better the discrimination. In this analysis, all of the product discrimination indexes are large and positive. In addition, because a number of new products are considered and each has a different adoption rate, the resulting composite score captures different levels of innovativeness, thereby reflecting an innovativeness continuum (Figure 1).

TABLE 1

Relationships Among Different Products Adopted and Overall Innovativeness Scale[a]

Product	Interproduct Correlations[b] 1	2	3	4	5	6	Point Biserial Correlation[c]	Product Discrimination Index	Percent Adopting
1. Proportional grading machine	1.00	.81	.17	.34	.40	.35	.85	1.00	52%
2. Grading machine with engineering standards	.81	1.00	.10	.16	.20	.08	.66	.78	40%
3. Flow molding machine	.17	.10	1.00	.10	.32	.14	.45	.37	20%
4. Fitting room transporter	.34	.16	.10	1.00	.32	.11	.56	.58	54%
5. Injection molding machine	.40	.20	.32	.32	1.00	.23	.64	.67	22%
6. Automatic bottom roughing machine	.35	.08	.14	.11	.23	1.00	.52	.51	26%

[a] Correlations and discrimination index are computed on hold-out sample. Percent adopting is based on total sample.

[b] These correlations suggest the extent to which the adoption of one product is predictive of the adoption of another product and are based on phi coefficients.

[c] These point biserial correlations are computed between the product status (adopted/not adopted) in the firm and the overall innovativeness measure based on the sum of the products adopted by a firm.

In summary, by evaluating the adoption patterns for a number of new machines a reliable criterion measure is developed which aligns firms on an innovativeness continuum and discriminates between innovative and laggard firms with respect to the innovative manufacturing content domain. This criterion measure will now be utilized to assess the effect of selected organizational characteristics on firm innovativeness.

Results

The relationship between firm innovativeness and the existence of an internal technical group and the presence of line managers with engineering expertise was evaluated by means of a multifactor analysis of variance procedure. Each firm was classified into one of four cells based on whether or not it had an internal technical engineering group (Factor A) and whether or not it had line managers with engineering expertise (Factor B). As might be expected in a field study, the number of firms in each cell is not equal. Therefore, the data are analyzed using the general linear model approach to ANOVA, and significance tests are computed following the order of elimination prescribed in Perreault and Darden (1975).

Table 2 summarizes statistics relevant to the analysis of variance. Traditional *F* tests indicate that the main effect for the existence of a technical engineering group within the firm is significant ($p < .04$) and that the effect for the presence of line managers with engineering expertise is not significant ($p < .15$). However, such tests of main effects must be considered with caution when potential interactions exist, especially in a nonorthogonal design. Examination of Figure 2, which plots the average innovativeness scores for firms in each level of each factor, reveals that such caution is warranted in this study.

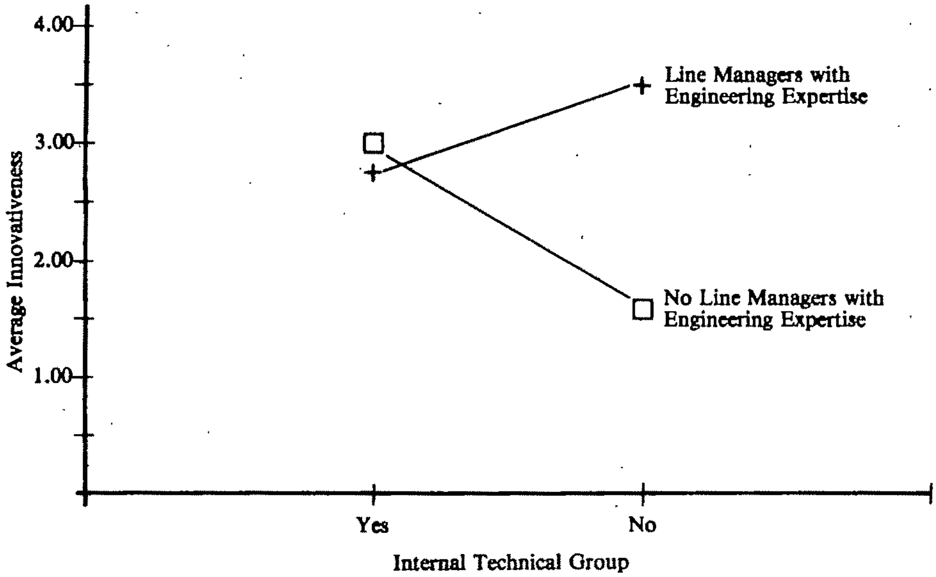
In the presence of potential interactions, tests of *simple* main effects are more appropriate than is the more common test for main effects (Kirk,

TABLE 2
Main Effects, Interaction Effects, and Simple Main Effects of Technical Engineering Group and Managers with Technical Expertise on Firm Innovativeness

Source of Variation	*Sums of Squares*[a]	*DF*	*Mean Square*	*F*	*Probability*
Within cells	121.12	46	2.63		
Technical engineering group (A)	11.01	1	11.01	4.18	.04
Engineer managers (B)	5.65	1	5.65	2.15	.15
A × B interaction	7.73	1	7.73	2.94	.08
A within B_1	1.12	1	1.12	.43	.52
A within B_2	17.61	1	17.61	6.69	.01
B within A_1	.19	1	.19	.07	.79
B within A_2	13.19	1	13.19	5.01	.02

[a] Sums of squares and tests of significance are based on the following order of elimination of effects: the test of the interaction effect is done after eliminating both main effects; the test of each simple main effect and each main effect eliminates the other effect.

FIGURE 2
Average Innovativeness of Firms in Each Level of Each Factor



1968). In essence, these test the effect of a factor within *each level* of the other factor. Thus, the tests of the simple main effects for these data were computed. They also are provided in Table 2.

The tests for the simple main effects confirm the patterns suggested by visual inspection of the means in Figure 2. First, there is a significant effect for the technical engineering group (Factor A) in those firms that have no line managers with engineering expertise (Factor B level 2). Results are in the predicted direction. Firms with a technical engineering group are more innovative. However, the engineering group effect is not significant in firms that do have line managers with engineering expertise (Factor B level 1).

An analogous pattern is detected when one evaluates the tests of the simple main effects for Factor B. There is not a significant effect in firms that have an internal technical engineering group (Factor A level 1). However, firms that have no internal engineering group are significantly more innovative when they have line managers who possess engineering expertise (Factor A level 2).

DISCUSSION

Despite an abundance of previous research, few generalizations and little consensus emerge from the innovation literature. Although numerous explanations have been advanced to explain this disarray of findings, few conceptual paradigms have been advanced that might clarify or integrate these widely differing findings. The present paper presents a paradigm designed to integrate the conceptual and methodological diversity characteristic of criterion measures in the innovation literature.

A multidimensional conceptual paradigm is presented. One dimension specifies the content domain of innovativeness relevant to a study. This dimension is conceptualized as ranging from specific to general. Another dimension specifies the reference domain and identifies the social system(s) within which innovativeness is a relevant measure. The reference domain is envisioned as falling along an internal-external continuum.

Given the numerous approaches to the study of innovation incorporated within the above paradigm, the current study sought to present a generalizable approach to innovation research. The proposed approach draws on item analysis statistical procedures to develop a reliable, discriminating, and internally valid criterion measure of innovativeness. It is shown that this procedure successfully overcomes commonly raised concerns pertaining to both single innovation studies and innovation studies employing composite criterion measures and that it is conceptually consistent with diffusion theory. This procedure is applicable to the common research situation in which it is desirable to compare the relative innovativeness of a number of organizations in a specific content domain.

Finally, the composite criterion measure developed in the present study was used to test the effects of two organizational characteristics on firm innovativeness. The findings generally support predictions based on diffusion theory that organizations that are better able to recognize and evaluate communications concerning the appropriateness to their firm of new products are more likely to be innovative. Specifically, in a sample of 50 domestic footwear manufacturing firms, the presence of a technical engineering group was found to be significantly related to the innovativeness of the firms that did not possess technical managerial expertise. However, engineering groups were not found to enhance significantly the innovativeness of the firms that had line managers with engineering expertise. A comparable relationship was found when investigating the effect of technical managerial expertise upon innovativeness. Firms with no internal engineering group were significantly more innovative when they had line managers who possessed engineering expertise. However, managerial technical expertise did not significantly increase the innovativeness of firms that had an internal technical engineering group.

These findings suggest that differences in innovativeness may be accounted for by the existence of either a technical engineering group or managers with technical expertise. It appears that if either of these situations exists, communication can be facilitated and thus the marginal impact of the other is minimal. In the same vein, firms which had *neither* condition were significantly less innovative. However, it cannot be argued that an engineering presence creates an advocacy situation for innovation. Rather, it may be that firms that are attuned to innovation and technological change implicitly recognize this in their organizational design. In either case, the firms that had such technical personnel available to evaluate communications were more innovative than the firms that did not possess such expertise.

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Characteristics and External Orientations of Boundary Spanning Individuals[1]

MICHAEL L. TUSHMAN
THOMAS J. SCANLAN
Columbia University

This field study investigates the characteristics of internal communication stars, the characteristics of boundary spanning individuals, and the extent to which boundary spanning individuals span multiple communication boundaries. The characteristics of boundary spanning individuals were found to be contingent on their subunit's work and on the information boundary they span. There is substantial boundary role overlap.

Substantial research indicates that boundary spanning individuals are an important mechanism for linking their organization or subunit to external sources of information (Aldrich & Herker, 1977; Coleman, Katz, & Menzel, 1966; Tushman, 1977; Rodgers & Shoemaker, 1971). The research reported in this paper extends the boundary spanning literature by investigating the characteristics of boundary spanners and by exploring the extent to which they link their subunits to more than one external area. Although the setting for this research is an R&D laboratory, the logic will be directed at the more generically interesting problem of characterizing those individuals who function as boundary spanners. This study was conducted at the R&D facility of a major American corporation. The laboratory is divided into seven departments which are, in turn, divided into projects. The types of projects range from more universally oriented research to more locally defined technical service. Details appear in the methods section.

PRIOR RESEARCH

Several studies have found that boundary spanning individuals are an efficient way to gather information from and transfer information to

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external areas (Allen & Cohen, 1969; Schwartz & Jacobson, 1977; Whitley & Frost, 1973; Keegan, 1974). Although widespread communication to external areas is inefficient and costly (Arrow, 1974), key individuals are able to communicate effectively across boundaries and are, therefore, an important linking mechanism (March & Simon, 1958). Boundary spanning individuals are those who are internal communication stars (that is, they are frequently consulted on work related matters) and who have substantial communication with areas outside their unit. Because subunits face several distinct external information areas, boundary spanning individuals evolve to attend to each (Miles, 1977; Tushman, 1977).

This research distinguishes between boundary spanning individuals and those who simply have substantial boundary spanning activity (Adams, 1976; Leifer & Huber, 1977; Keller & Holland, 1975). Individuals who have substantial boundary spanning activity (BSA) may gather information from external areas, yet there is no evidence that this information is disseminated within the organization (Von Hippel, 1976). Boundary spanning individuals, however, are strongly linked externally and internally, so that they can both gather and transfer information from outside their subunit (Scanlan & Tushman, 1979).

Although there is substantial evidence of boundary spanning individuals from many disciplines (Coser, 1975; Crane, 1972; Sundquist, 1978; Schwartz & Jacobson, 1977; Webster, 1970; Hirsch, 1972), there has been less convergence on the characteristics of these key individuals. Furthermore, there has been no research to assess the extent to which boundary spanning individuals span single or multiple communication boundaries. Because boundary spanning individuals are internal communication stars who are also strongly linked externally, this research investigates: (1) characteristics of internal communication stars for subunits with different tasks, (2) characteristics of boundary spanning individuals who specialize their external communication to specific domains, and (3) the degree to which these individuals span multiple communication boundaries.

Internal Communication Stars

Allen (1970), Farris (1972), Blau (1963), and Taylor (1972) have found that in units with complex tasks, communication stars were more educated and more professional (they read more, published more, had more patents) than were less active members of the organization. Furthermore, Allen and Taylor reported that approximately 50 percent of the communication stars were supervisors. However, in organizations with more routine tasks, Pettigrew (1972) and Frost and Whitley (1971) found that communication stars were more likely to be supervisors (or administrators) and were not more educated than non-stars.

These studies, although different in setting and method, have a common thread. Internal communication stars are seen by their colleagues as being technically competent; they are consulted more frequently because they are perceived to have work-related expertise. This association between perceived competence and colleague consultation has been found in a variety of settings including: research organizations (Keller & Holland, 1975); informal gangs (Whyte, 1943); academic disciplines (Crane, 1972; Campbell, 1969); universities (Baldridge, 1971; Schwartz & Jacobson, 1977); governmental settings (Wilensky, 1967; Sundquist, 1978); and in medical communities (Coleman et al., 1966).

If perceived competence is an important determinant of internal contact and if different tasks require different backgrounds, skills, and orientations, the characteristics of internal communication stars may be contingent on the nature of their subunit's work (for example, research projects require information and skill to develop new knowledge; technical service projects require skill in modifying current products given existing knowledge). These ideas suggest several research questions:

1. Are the differences between communication stars and non-stars similar across different task categories? For instance, will differences between stars and non-stars in research projects be the same as differences found in technical service projects?
2. Are the characteristics of communication stars different for various task categories? For instance, will research stars have characteristics different from those of technical service stars?

Boundary Spanning Roles

To perform an external linking function, internal communication stars must also be strongly connected to external information areas. Consistent with research in a range of settings, Tushman (1977) found that communication stars had significantly more communication than did non-stars with other areas in the laboratory, with areas in the larger corporation, and with areas outside the organization (Allen & Cohen, 1969; Schwartz & Jacobson, 1977; McClure, 1978).

The boundaries between the specific project and other areas of the laboratory, other organizational areas, and areas outside the organization are each associated with specialized information requirements (Miles, 1977). Communication with other laboratory areas focuses on technical problem solving, communication with the larger organization focuses on project implementation and administration, and communication with extra-organizational areas focuses on information from suppliers, vendors, customers, or professional areas (Rosenbloom & Wolek, 1970; Tushman, 1978). If external information areas have contrasting information needs and demands, and if boundary spanning individuals must be able to communicate effectively across these boundaries, then boundary spanning individuals may have specialized characteristics to fit each area's information requirements (Thompson, 1967; Kelly & Kranzberg, 1975).

These ideas suggest several additional research questions:

3. Are there differences in the characteristics of boundary spanning individuals who focus on particular external areas? For instance, do

intra-laboratory boundary individuals have different characteristics from those individuals who link their projects to the larger organization?

4. Do individuals specialize in a single information area, or are there boundary spanning individuals who span several information boundaries simultaneously?

SETTING AND METHODS

This study focused on the communication activity of the technical staff (secretaries and administrators were not included) of the R&D facility of a large American corporation ($N=345$). The laboratory is physically isolated from the rest of the corporation and is divided into seven departments (or divisional laboratories). The departments are, in turn, organized into separate project areas. The projects ($N=61$) were stable over the course of the research, and each respondent was a member of only one project.

Technical Communication

As boundary spanning is basically an informal process, this research focused on oral communication (Allen, 1977; Keegan, 1974). Although written media assume greater importance for tasks that are either very routine or nonroutine, even under these conditions boundary spanning individuals direct their more locally oriented colleagues to more formal media (Pettigrew, 1972).

To provide communication data, individuals were asked to report their actual, work-related, oral communication for a number of selected days (the respondents were asked not to report strictly social communication, nor did they report written communication). These data were collected once a week for 15 weeks (an equal number of each of the weekdays was chosen). The overall response rate was 93 percent; moreover, 69 percent of all the communication reported within the laboratory was mentioned by both parties. See Weiss and Jacobson (1960) for comparative data. The extra-laboratory data were self-report data that could not be corroborated with discussion partners.

In order to identify the internal stars and boundary spanning individuals, the communication activity of each professional was separated into the following mutually exclusive communication domains: intra-department, intra-laboratory (outside the department), organizational, and extra-organizational. Extra-organizational communication was further separated into professional (universities, professional societies) and operational (suppliers, vendors, customers) areas. Consistent with Allen (1970) and Whitley and Frost (1973), internal stars were defined as those individuals in the top fifth of the intra-department communication distribution, and 50 internal communication stars were located. (One department was substantially larger and more heterogeneous than the other six. It was excluded from these analyses.) Boundary spanning individuals are those internal stars who also are in the top fifth of an external communication distribution (i.e., laboratory, organization, extra-organization).

Project Task Characteristics

The following task categories were developed with the laboratory's management to form a task dimension ranging from more universal (research) to more locally defined (technical service).

1. Basic research: Work of a general nature intended to apply to a broad range of applications or to the development of new knowledge about an area.
2. General research: Work involving basic knowledge for the solution of a particular problem. The creation and evaluation of new concepts or components but not development for operational use.
3. Development: The combination of existing feasible concepts, perhaps with new knowledge, to provide a distinctly new product or process. The application of known facts and theory to solve a particular problem through exploratory study, design, and testing of new components or systems.
4. Technical service: Cost/performance improvement to existing products, processes, or systems. Recombination, modification, and testing of systems using existing knowledge. Opening new markets for existing products.

Using these definitions, respondents were asked to select one category that best characterized the objective of their project and to indicate, on a 3-point scale, how completely the project's objectives were represented by the selected category. The 12 possible answers to this question were arranged and scored along a single numerical scale ranging from completely basic research to completely technical service.

As in Pelz and Andrews (1966), in a separate question, respondents also were asked to indicate what percentage of their project's work fell into each of the four categories. A weighted average of the percentages was calculated for each respondent to yield a score comparable with the previous question. The scored responses to these two questions were averaged (Spearman-Brown reliability = .91).

Project measures were calculated by averaging individual members' scores. To check for the appropriateness of pooling, a one-way ANOVA compared within-project variance with between-project variance, and Bartlett's *M*-test examined the homogeneity of intra-project variance. Following these two broad tests, separate *F*-tests ensured that the variance within each project was not significantly greater than the pooled variance. Measures for 55 projects passed all three tests and clustered into the following task categories: research (general) = 13 projects (there were no basic research projects); development = 22 projects; and technical service = 20 projects.

Demographic Data

Approximately 80 percent of the technical staff responded to a questionnaire that asked: (1) educational level (1 = high school through 5 = Ph.D.); (2) number of technical association or trade meetings attended over the past two years (these were meetings attended by suppliers, customers, vendors, and other competitors); (3) number of papers presented or published in the past five years; (4) years worked in the laboratory; (5) formal status (1 = department manager through 4 = bench-level scientist or engineer); and (6) whether or not the individual had been transferred between departments within the laboratory (scored 0 or 1).

A factor analysis was performed to identify any redundancy among the set of demographic variables. Educational level and papers presented or published combined to form the variable termed professional orientation ($r = .65$). Formal status, years in the laboratory, number of technical association or trade meetings attended, and number of transfers within the laboratory remained as distinct variables.

RESULTS

Internal Communication Stars

Before addressing research questions one and two, it is instructive to compare communication stars vs. non-stars for the entire sample. Stars have more laboratory experience and are located at higher levels of the hierarchy than non-stars (50 percent of the stars are supervisors). Furthermore, if the three individuals who were hired at mangerial levels are eliminated, then the remaining stars have significantly ($p < .08$) more laboratory transfers than do non-stars. Communication stars also are more externally oriented than non-stars; they are both more professionally and operationally oriented than non-stars (Table 1). (A professional orientation refers to gathering general technical/scientific information, and an operational orientation refers to information gathering focused on more specific organizational objectives [Rosenbloom & Wolek, 1970].)

TABLE 1
Characteristics of Communication Stars and Non-Stars

	Formal[a] Status	*Years in Laboratory*	*Laboratory Transfer*	*Professional Orientation*	*Technical/ Trade Meetings*
Stars ($N = 40$)	3.15	9.73	.28	2.06	6.23
Non-Stars ($N = 144$)	3.78	6.68	.17	1.55	2.81
Significance	**	**	($p = .12$)	**	*

[a] Lower scores indicate higher status.
*$p < .05$
**$p < .01$

A stepwise discriminant analysis indicates that hierarchical level is the most powerful determinant of intra-departmental communication, and that professional orientation and laboratory tenure are other important determinants of internal communication (standardized discriminant coefficients are, respectively, .70, -.36 and -.34; overall $F = 10.33$, $p < .01$). Compared to their colleagues, then, communication stars have strong and diverse external orientations. Their internal linkages are based on both formal (e.g., transfers, status) and informal (tenure) mechanisms.

If communication stars are those individuals who are most frequently approached for technical consultation (Blau, 1963; Allen, 1977) and if different tasks require special skills, backgrounds, and information, then differences between stars and non-stars may be specialized by task category. To address research question one, Table 2 contrasts the characteristics of stars and non-stars for research, technical service, and development projects.

For each task category, stars have more formal status than non-stars. Formal status is associated with internal consultation independent of task category. There are, however, differences by task category. Communication stars in the research projects have had significantly more intra-laboratory transfers and have more laboratory experience than non-stars in research projects. Furthermore, communication stars in research projects are more professionally oriented that non-stars (that is, these individuals not only have more advanced degrees, but they also choose to publish more than non-stars in research areas). A stepwise discriminant analysis indicates that years in the laboratory and professional orientation are the strongest determinants of being consulted in research areas. Communication with operational areas (technical/trade meetings) is inversely related to technical consultation within research projects (Table 3).

TABLE 2

Characteristics of Communication Stars and Non-Stars by Task[a]

	Status	*Years in Laboratory*	*Laboratory Transfer*	*Professional Orientation*	*Technical/ Trade Meetings*
Research					
Stars ($n = 12$)	3.50	8.92	.33	2.63	2.33
Non-stars ($n = 36$)	3.89	4.44	.11	1.82	2.64
Significance	**	***	*	**	
Technical Service					
Stars ($n = 8$)	2.92	7.13	.13	1.58	5.38
Non-stars ($n = 32$)	3.81	6.69	.06	1.45	2.06
Significance	***				***
Development					
Stars ($n = 14$)	3.43	9.86	.36	1.57	4.50
Non-stars ($n = 68$)	3.87	7.06	.24	1.35	3.03
Significance	***				

[a] Six stars and eight non-stars were upper level supervisors who spanned several task categories and therefore are not included in this or following analyses based on task categories.

*$p < .10$

**$p < .05$

***$p < .01$

TABLE 3
Characteristics of Communication Stars and Non-Stars by Task: Discriminant Analysis

A. *For research tasks* — Stars ($n=12$) vs Non-Stars ($n=36$)

Variable	Standardized Discriminant Coefficient	F (1,43)
Years in laboratory	−.66	4.23**
Professional orientation	−.59	4.76**
Status	.44	5.93**
Technical/trade meetings	.39	2.73*
Correctly classified: 77%	Overall F(4,43) =	4.90**

B. *For technical service tasks* — Stars ($n=8$) vs Non-Stars ($n=32$)

Variable	Standardized Discriminant Coefficient	F (1,37)
Status	.65	8.36***
Technical/trade meetings	−.54	2.86*
Correctly classified: 80%	Overall F(2,37) =	5.81***

C. *For development tasks* — Stars ($n=14$) vs Non-Stars ($n=68$)

Variable	Standardized Discriminant Coefficient	F (1,80)
Status	1.00	6.58**
Correctly classified: 83%	Overall F(1,80) =	6.58**

$^{*}p<.10$
$^{**}p<.05$
$^{***}p<.01$

For technical service and development projects a different pattern emerges. For technical service projects, internal communication stars have more formal status and are more strongly connected to operational areas than are non-stars (that is, these individuals choose to attend technical/trade meetings more than do non-stars). For development projects, the only difference between stars and non-stars is supervisory status.

One interpretation of these results is that those with higher rank are required to communicate with their subordinates and are by definition internal communication stars. However, not all supervisors are stars. Only 48 percent of the laboratory's top management are internal communication stars, and the percentage of supervisors who are internal communication stars varies from 20 percent in development projects to 60 percent in technical service projects. Furthermore, throughout the laboratory, only 50 percent of the stars are supervisors. Supervisory status, then, is neither a necessary nor sufficient condition to be an internal communication star. Formal position, however, does facilitate internal consultation.

Research question 2 asked if communication stars in different task areas would have different characteristics. There are significantly more stars as supervisors in technical service projects than in research or development projects (Chi-square = 5.32; $p<.10$). Evidently, supervisors in the more organizationally defined and routine technical service projects are more likely to have requisite task information than are supervisors in the more universally defined and more complex research or development projects. Besides formal status, there are no other differences in the determinants of internal linkages for stars in different task categories (there are no systematic differences in years in the laboratory or internal transfers).

There are, however, differences in external orientation between stars in different task areas. Stars in research projects are significantly more professionally oriented than are stars in the other categories ($p<.07$). Technical service stars, on the other hand, are more strongly oriented towards the operational domain than are stars in research projects ($p<.04$). Communication stars, then, seem to be oriented towards information areas that are most crucial to their project's work requirements.

Boundary Spanning Individuals

Laboratory and organizational liaisons were identified by selecting those internal communication stars who also were in the top fifth of the laboratory or organization communication distribution (Allen, 1977; Whitley & Frost, 1973). Of the 50 internal stars, 12 linked their departments to other laboratory areas (laboratory liaisons); 10 individuals linked their departments to the larger organization (organizational liaisons). The requirements of both boundary roles were satisfied by 14 individuals. They were internal communication stars who also were strongly linked to other departments within the laboratory as well as to areas in the larger organization. There were 14 communication stars who were not strongly linked to either the laboratory or the larger organization. In response to research question 4, then, there is substantial role overlap; of the boundary roles identified, approximately 39 percent were individuals who spanned both boundaries.

Communication within the laboratory deals with technical problem solving and development. Communication with organizational areas deals with questions of implementation and administration (Myers & Marquis, 1969; Tushman, 1978). Research question 3 reasoned that because different information areas have different requirements and demands, boundary spanning individuals who focus on particular domains may have specialized characteristics to meet those demands.

Section A of Table 4 contrasts the characteristics of laboratory and organizational liaisons. Consistent with the more universal demands of the intra-laboratory boundaries, laboratory liaisons are more professionally oriented than are organizational liaisons. Organizational liaisons, on the other hand, consistent with the more organizationally defined and experienced based information requirements of the laboratory-organization boundary, are more organizationally experienced than are laboratory liaisons.

Both boundaries were spanned by 14 internal communication stars. They were strongly linked to other laboratory areas as well as to areas in

TABLE 4
Characteristics of Communication Liaisons

	Status	Years in Laboratory	Laboratory Transfer	Professional Orientation	Technical/Trade Meetings
A. Laboratory liaisons	3.40	7.1	.30	2.40	4.30
Organizational liaisons	3.44	10.3	.22	1.33	2.89
d.f. = 17		*		**	
B. Laboratory liaisons	3.40	7.1	.30	2.40	4.30
Laboratory and organizational liaisons	2.40	11.1	.30	2.65	14.60
d.f. = 18	**	*			

*$p<.10$
**$p<.05$
***$p<.01$

the larger organization. These individuals had the professional characteristics of laboratory liaisons as well as the organizational experience of organizational liaisons (section B of Table 4). The only statistically significant difference between individuals spanning both boundaries and those spanning a single boundary is that the former are more likely to be supervisors.

Because stars had significantly greater extra-organizational communication than non-stars in 3 of the 6 departments, only 12 gatekeepers (that is, internal stars who also were strongly connected to external areas) were identified. Only 2 of the 12 gatekeepers simply tend to information areas outside the organization (Table 5). The other 10 gatekeepers also serve as either laboratory or organizational liaisons. Furthermore, 4 of these 12 individuals have extensive communication with all three communication areas: intra-laboratory, organizational, and extra-organizational. One-third of the gatekeepers, then, are individuals who link their projects to three external information areas.

There is further gatekeeper specialization. Gatekeepers who span two boundaries tend to link their project to a particular external area. Technical service gatekeepers (with one exception) also attend to the laboratory-organization interface, and gatekeepers in research areas also attend to the intra-laboratory boundary (Table 5). Although the sample size requires caution, these data suggest the gatekeepers occupy an even more central

TABLE 5
Number of Gatekeepers Who Also Span Other Communication Boundaries by Task

	Boundaries Spanned				
Task Area	External Only	External and Laboratory	External and Organizational	External, Laboratory, and Organizational	Total
Research	2	3	0	3	8
Technical service	0	1	2	1	4

role in the transfer of information than previously recognized. These key individuals are sources of critical information to their own areas as well as to the larger laboratory and organization.

Gatekeepers have the same characteristics as the individuals who span both the laboratory and organizational boundaries. They tend to be supervisors (30 percent are above first-line supervisor) who have the same degree of professional involvement as laboratory liaisons and the same amount of organizational experience as organizational liaisons.

REVIEW AND DISCUSSION

Boundary spanning individuals are an important mechanism by which subunits are linked to external sources of information. These individuals are strongly linked to their colleagues and have extensive links outside their subunit. This research has investigated the characteristics of these key individuals for different task areas and information domains.

Over the entire sample, communication stars had significantly more laboratory experience and more transfers within the laboratory and were higher in the hierarchy than non-stars. Although formal status was an important determinant of internal linkage, 50 percent of the communication stars were bench-level scientists or engineers. Internal linkage, then, can be facilitated formally via administrative action (for example, transfers and promotion), as well as informally (for example, networks and informal status that may evolve with experience). Consistent with substantial literature, communication stars had stronger and more diverse external linkages than did non-stars.

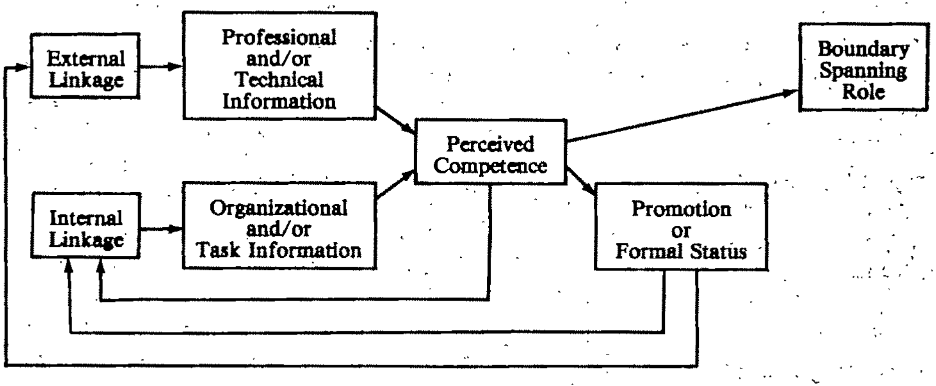
The characteristics and external orientations of communication stars and non-stars were systematically different by task area. In research projects, stars were professionally oriented, and their internal linkage was based on laboratory transfers, laboratory experience, and formal status. Consistent with the more universal nature of research tasks, the stars' internal linkage was established through both formal and informal mechanisms. In more organizationally defined technical service projects, on the contrary, stars were more operationally oriented, and their internal linkage was based primarily on formal status.

The alternate internal linkage mechanisms and the different external orientations are consistent with the idea that work-related competence is a primary determinant of being an internal communication star. For work in the more locally defined technical service areas, supervisors may be a primary source of both organization and task related information (Rosenbloom & Wolek, 1970; Keller & Holland, 1978). These supervisors seem to focus their external communication on technical or trade meetings because these settings provide operational information from suppliers, vendors, and customers. For the more universal research tasks, however, more informal mechanisms for developing internal linkages (for example, transfer and experience) are important to complement formal status. Furthermore, communication stars in research projects focus on professional areas because these areas will provide up-to-date information on new knowledge. These data, then, suggest that colleague consultation is not formally prescribed, but rather an emergent laboratory phenomenon; individuals approach those whom they see as technically competent regardless of formal status.

There also were differences in the characteristics of those boundary spanning individuals who spanned different boundaries. Consistent with information needs of the different areas, laboratory liaisons were more professionally oriented, and organizational liaisons were more organizationally experienced. Those individuals who spanned both laboratory and organizational boundaries tended to be supervisors with both extensive laboratory experience and a strong professional orientation.

This research suggests that perceived competence is an important determinant of boundary role status. What is most likely is that technically competent individuals have extensive laboratory and organizational communication networks developed from both professional involvement and from organizational experience (Allen, 1977; Pelz & Andrews, 1966; Edstrom & Galbraith, 1977). Perceived technical competence, in turn, stimulates internal consultation and may lead to a promotion (Allen, Gerstenfeld, & Gerstberger, 1968). Promotion further facilitates both internal and external exposure, thereby enhancing the individual's ability to serve as a liaison between the subunit and several external information areas (Figure 1). Although these results are limited to this setting, they are consistent with results found in a variety of settings, from Blau's (1963) state employment agency, to Lazarsfeld, Berelson, and Gaudet's (1948) communities, to Coleman et al.'s (1966) medical communities, to Rogers and Shoemaker's (1971) rural settings. Together, these results provide strong support for the linkage between perceived competence, colleague consultation, and boundary role status.

FIGURE 1
Antecedents of Boundary Spanning Roles


External Linkage
Professional and/or Technical Information
Boundary Spanning Role
Perceived Competence
Internal Linkage
Organizational and/or Task Information
Promotion or Formal Status

The final analyses investigated the extent to which boundary spanning individuals linked their projects to more than one external area. There was substantial role overlap; 39 percent of the boundary spanning individuals linked their projects to both laboratory and organizational areas. Similarly, gatekeeper analyses found that one third of the gatekeepers attended to all three communication boundaries. Only two gatekeepers specialized on a single external area; the rest served as linking persons to both an external as well as a laboratory/organizational information area, the particular external information area being contingent on the nature of the project's task.

This degree of overlap substantially increases the boundary spanning individuals' effectiveness in coupling their subunit to external areas. Rather than having to rely on separate individuals for information from different external areas, more locally oriented staff members can go to a small set of individuals who can provide information from several external areas. This network specialization decreases the number of paths necessary to explore in order to get external information. From an organizational point of view, the existence of boundary role overlap increases the number of linkages to external information areas because boundary spanning individuals frequently serve a linking function for several areas in the organization. On the other hand, this substantial degree of role overlap increases the boundary spanning individual's relative importance to the organization and enhances his or her control over the acquisition and interpretation of external information. The benefits of this potentially more efficient information network versus the potential costs of decreased managerial control and political use of information must be investigated (Pettigrew, 1972).

CONCLUSIONS

This research reinforces the importance of boundary spanning individuals as a key mechanism to link more locally oriented personnel to external information sources. Boundary spanning individuals were identified who tended to distinct external information areas. Characteristics of these individuals were specialized to meet the information requirements of both their project as well as their information boundary. Finally, there was substantial boundary role overlap—many individuals linked their projects to several external information areas. From these results, it can be inferred that boundary role status is based primarily on perceived technical competence. This hypothesis, of course, must be investigated in future research. Future research must also address the determinants of internal consultation and external exposure, track the evolution of boundary spanning individuals, and explore the extent to which boundary spanning individuals remain in these linking roles over time. Only then can the importance of individual differences and organizational factors on the development of boundary spanning individuals be assessed. Finally, if boundary spanning individuals mediate critical information they will be relatively powerful actors (March & Simon, 1958; Pettigrew, 1972). Future research must investigate the role of boundary spanning individuals in organizational decision making beyond that of simply transferring information (O'Reilly & Pondy, 1979; Aldrich & Herker, 1977).

More pragmatically, this research suggests that it is possible to manage the careers of key individuals. Indeed, the 14 internal communication stars who were weakly connected to external information areas may represent untapped potential for the laboratory. This research suggests specific levers for influencing internal and external communication. For example, initial job assignments, in-house training, transfers, and varied job assignments might enhance an individual's intra-organizational communication network (Edstrom & Galbraith, 1977). Furthermore, management could encourage more extensive external networks through: selective travel allowances (professional-technical meetings; university symposia), more liberal telephone budgets, easing access to scientific and/or technical information (books, reports, journals), or support for special education (seminars, short courses). Managers, then, can select potential boundary spanning individuals and facilitate the development of their internal and external communication networks.

Finally, if formal status does not preclude continued contact with lower level individuals, explicit recognition and promotion of boundary spanning individuals may enhance their external as well as their organizational exposure. Indeed, promotion of boundary spanning individuals not only recognizes and rewards that critical activity, but it also permits those individuals to develop a more diverse external communication network and thereby attend to several external information areas. On the other hand, formalizing this role may be associated with role ambiguity and role conflict (Miles, 1977; Keller & Holland, 1975). Future research, then, must investigate the consequences of formalizing this informal process.

This research provides further support for the importance of boundary spanning individuals and suggests that work related competence is an important determinant of boundary role status. Future research must explicitly investigate this hypothesis as well as extend our knowledge of the informational and decisional roles of boundary spanning individuals.

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A Longitudinal Investigation of Task Characteristics Relationships[1]

RICKY W. GRIFFIN
University of Missouri–Columbia

This study investigated the stability of individual perceptions of task characteristics and the stability of individual reactions to these perceptions at two points in time. Results indicated that individual perceptions of task characteristics are relatively stable over a 3-month time interval. However, individual reactions to perceived task characteristics are less stable and somewhat more complex.

The study of perceived task characteristics and their impact on individual attitudes and behaviors has stimulated a great deal of empirical research. The approach most often taken is to assess the extent to which perceived task characteristics are positively correlated with affective and/or behavioral responses. In a recent review of the literature, Pierce and Dunham (1976) conclude that the empirical evidence appears to support these suggested relationships. However, as also noted in that review, the study of task design suffers from a dearth of longitudinal research. Specifically, Pierce and Dunham note that "Most investigations were one-shot studies. The internal validity of one-shot designs is potentially contaminated and external validity is minimal" (1976, p. 94). Hence, there is a need for longitudinal research to assess task characteristics relationships over time. The purpose of the present paper is to present the results of a 3-month study of the relationships among task characteristics and outcome variables.

To date, few studies have addressed the issue of task characteristics perceptions over time. Those studies that do present longitudinal data generally have yielded inconclusive findings with respect to perceptions of tasks. Hackman, Pearce, and Wolfe (1978) present the results of an actual task design change effort. Data were collected approximately seven months apart, with a task design change intervention occurring in between. Two task characteristics (variety and autonomy) reflected significant mean changes from time 1 to time 2. However, three perceived characteristics (identity, significance, and feedback) did not change, even though an objective task change supposedly had taken place.

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[1] Portions of this paper were presented at the Tenth Annual Conference of the American Institute for Decision Sciences, New Orleans, 1979.

Dunham, Newman, and Blackburn (1978) describe two different task redesign studies, both of which provide pre- and post-measures of perceived task characteristics with a task change taking place between measures. The time interval for one study was 3 months and the interval for the other was 12 months. Findings reflected no significant mean change in task complexity perceptions for the 3-month study. However, a significant increase in perceptions of complexity did occur in the 12-month study. Dunham et al. (1978) suggest that one explanation for these findings might be that a relatively long time interval (e.g., one year) is necessary for task characteristics changes to manifest themselves in the form of altered perceptions.

Further support for the relative stability of task characteristics perceptions is found in Bechtold, Sims, and Szilagyi (1979), who investigated possible causal relationships among task perceptions and outcome variables. Relationships were assessed over time intervals of 9 months, 18 months, and 27 months. Results indicated that the longer time lags reflected the strongest evidence for causality, suggesting that reactions to perceived task characteristics may take an extended period of time to manifest themselves.

A parallel question of task perceptions that a longitudinal study can address pertains to task dimensionality. Recently, Dunham (1976) and Dunham, Aldag, and Brief (1977) have presented data indicating that the dimensionality of tasks, in terms of perceived characteristics, may vary across samples. Dunham et al. (1977) collected data from 20 subsamples within 5 different organizations. Factor analyses results suggested that task dimensionality, as measured by the Job Diagnostic Survey (Hackman & Oldham, 1975) varied substantially across the samples. As alternative explanations for these findings, Dunham (1976) suggests that: (1) tasks may be unidimensional, (2) tasks may be multidimensional, but existing scales are inadequate for assessing this dimensionality, or (3) dimensionality may vary across settings. Dunham (1976, 1977) appears to favor the first explanation, at least for his data.

Explanations 2 and 3, however, warrant additional investigation. The Dunham (1976) and Dunham et al. (1977) studies utilized the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1975). Another instrument that has been used to measure perceived task characteristics is the Job Characteristics Inventory (JCI) developed by Sims, Szilagyi, and Keller (1976). Sims et al. (1976), Pierce and Dunham (1978), and Griffin, Moorhead, Johnson, and Chonko (1980) all present evidence supporting the multidimensional perspective as assessed by the JCI. Hence, these studies provide additional support for Dunham's (1976) explanations 2 and/or 3 for conflicting evidence pertaining to task dimensionality.

A question that arises, then, is one of dimensional stability over time. The previously cited research investigated task dimensionality *across* samples, but *within* one time point. If task perceptions are relatively stable over short time intervals, it follows that whatever degree of task dimensionality may be present for a given sample should also be relatively stable over short time intervals. Hence, another issue pertaining to task perceptions is the dimensionality of tasks *within* samples, but *across* time points.

In summary, then, the preceding discussion of task perceptions suggests two research questions to be addressed. The first is: Are individual perceptions of task characteristics relatively stable over time? The second pertains to task dimensionality and may be stated as follows: Is the perceived dimensional nature of a set of tasks within one organization relatively stable over time?

These questions are important for a variety of reasons. The first reason pertains to construct validity. In the absence of a task change intervention, task characteristics perceptions over time should remain stable, change systematically (i.e., as a result of increasing experience and tenure), and/or change randomly (i.e., be attributable to error variance in measurement or lack of construct validity). Assuming that error variance can be minimized, and this is certainly a debatable assumption, it follows that task characteristics perceptions must be stable or change systematically as a necessary condition for the construct validity of the task characteristics framework. A second reason for the importance of this study pertains to measurement reliability. As noted by Brief and Barr (1978), few test-retest correlations for task characteristics measures have been reported. Finally, the research questions have implications for managerial practice. If, as the evidence indicates, task perceptions are stable over short time intervals, it follows that evaluations of task design changes will require an extended period of time to insure that perceptions are altered.

The other set of issues to be addressed by this longitudinal study relates to individual reactions to perceived task characteristics. As summarized by Pierce and Dunham (1976), empirical research has tended to support the argument that perceived task characteristics are related to individual affective responses, but that relationships involving behavioral responses have less empirical support. Further, the moderating effects of individual growth need strength on the task design-outcome relationship have also been fairly well supported (Pierce & Dunham, 1976). Again, however, much of the empirical evidence pertaining to task design is of a static nature. Hence, research is needed to assess the extent to which the measurable relationships among task and individual variables are consistent over time. These relationships should be manifested in the form of a similar pattern of intercorrelations among task and individual variables at different time points and also in terms of support (or nonsupport) for the moderating effects of need strength in a consistent fashion at different time points.

Another issue to be considered relates to causal priorities among variables. Based on the general arguments of task design researchers, for example, Hackman and Oldham (1976), a reasonable assumption might be to expect that task characteristics will exert a causal influence on satisfaction and performance. That is, if employees react positively to certain task attributes, then an employee's perception that these attributes exist in his/her job should lead to the employee being satisfied and/or performing at a high level. (Of course, the possibility also exists that reciprocal and/or reverse causality may exist.)

Further, if growth need strength does moderate the task characteristics-outcome relationship, it follows that causal priorities among task characteristics also should vary. More specifically, the causal priorities among variables should be stronger and more well defined for employees with high growth need strength than for those with less strong need strength.

Therefore, this research also will address the following three questions: (1) Are individual reactions to perceived task characteristics consistent over time? (2) Are the moderating effects of growth need strength on the task design-outcome relationship consistent over time? (3) Can causal priorities among task characteristics and outcome variables be detected over a 3-month time interval, and are such priorities consistent with existing research on high and low growth need strength individuals?

Again, answers to these questions should provide additional support for the construct validity of the task design framework as it is currently operationalized. Further, the practical implications are also important in that organizations implementing task design changes should be aware of the stability of employee reactions to their jobs.

METHOD

Research Setting and Sample

Data were collected from employees of a nonunionized manufacturing plant located in a large southwestern city. The plant employs a total of 351 employees. Jobs performed within the plant are primarily manual or skill-oriented. However, plant supervisors indicated that jobs were fairly heterogeneous in terms of required skills, complexity, and training time.

Procedure

Questionnaires were originally distributed to a total of 342 employees. On the date of distribution, nine employees were absent from work. In addition, each employee received a postage-paid envelope addressed to the researcher and a cover letter explaining that the study was an attitude survey and that responses were strictly confidential. Employees were asked to complete the questionnaire on their own time and return it directly to the researcher in the envelope. Participants were asked to provide their payroll number, but instructions stressed that this identification was optional. A total of 129 (37.7 percent) usable questionnaires were returned, 109 with identification.

Three months later, questionnaires again were distributed to all available employees (340). A 3-month time interval was selected because of its appropriateness for another set of variables investigated in the same study (Griffin, 1980). For this study, the 3-month interval should be interpreted as one of sampling convenience. Between the time 1 and time 2 administrations, four employees changed shifts and two others changed jobs. Plant supervisors indicated that these job changes were from one machine to another machine of the same general nature and complexity. No other task changes occurred during the study. A total of 171 (50.3 percent) usable questionnaires were returned for the second distribution, 160 with identification. Of the 109 respondents providing identification from the first administration, 107 (97.2 percent) returned questionnaires with identification during the second administration. A follow-up study involving interviews with respondents and nonrespondents found no significant differences between the two groups (Griffin, 1980). Unless otherwise noted, the results reported in this paper are based on the data provided by the 107 respondents who identified themselves and who returned the questionnaire at both time points.

Measures

Task Characteristics—Task variety, autonomy, feedback, and identity were measured by the JCI (Sims et al., 1976). The JCI provides indices of each of these four characteristics with 5, 6, 6, and 4 items, respectively. Responses are made on 5-point Likert scales. As previously summarized, substantial validation work went into the development of the JCI, and the instrument has been favorably compared to the JDS (Pierce & Dunham, 1978).

Growth Need Strength—Individual growth need strength was assessed by a 12-item subscale of the JDS (Hackman & Oldham, 1975). Using an ipsative format, the measure provides an index of strength of higher order needs relative to lower order needs. Aldag and Brief (1979) present evidence supportive of the scale's validity and reliability.

Satisfaction—Satisfaction with the job and satisfaction with supervision were measured with 4 and 3 items, respectively. The items were taken from Alderfer's (1972) ERG scale. The response format was 5-point Likert scales. In general, factor analysis results of the total satisfaction scale, including facets of satisfaction not relevant to the present discussion, supported the scale's construct validity. Satisfaction with the job was selected as an appropriate outcome variable because task characteristics should logically influence affective reactions to the job, whereas satisfaction with supervision was used because Griffin (1980) has suggested that relationships may exist among leader behaviors and task characteristics. In supplemental analyses, no relationships were found among task characteristics perceptions and other facets of satisfaction.

Productivity—Individual productivity was measured by a numerical index generated by the organization for most employees on a daily basis. This index of productivity reflects the employee's total output for the day, controlling for machine set-up time, down-time, and scrappage. The measure is expressed as a percentage, with 100 percent representing standard. The measure was available for 88 of the 107 employees participating in both phases of the study. For purposes of this study, each individual's productivity was calculated by averaging the daily indices for the five days before and the five days after the dates of questionnaire administration.

Means, standard deviations, and Cronbach's alpha estimates of scale reliabilities are presented in Table 1. In general, the scale reliabilities compare favorably to other reliability estimates reported in the literature for the same and similar scales. The task characteristics measures have a low value for alpha of .86 for feedback at time 1, and at time 2 all values equal or exceed .96.

TABLE 1
Means, Standard Deviations, Scale Reliabilities (Cronbach's Alpha), and Values of *t*

	Time 1 ($N = 129$)			*Time 2 ($N = 171$)*			
Variable	*Mean*	*Standard Deviation*	*Alpha*	*Mean*	*Standard Deviation*	*Alpha*	t^a
Variety	2.95	1.18	.89	2.96	1.35	.96	.96
Autonomy	3.45	1.15	.89	3.21	1.39	.96	−1.77
Feedback	2.83	1.09	.86	2.89	1.35	.96	.70
Identity	3.11	1.31	.91	3.03	1.51	.97	−1.01
Need strength	3.17	1.04	.92	3.03	1.40	.97	− .08
Productivity[b]	1.08	.14	—	1.11	.64	—	.93
Satisfaction with job	3.25	1.00	.79	3.24	1.15	.93	.54
Satisfaction with supervision	3.79	.98	.79	4.32	.81	.89	5.05*

[a] Mean differences evaluated by two-tailed paired t-test, $n = 107$.
[b] $N = 88$.
*$p < .001$

Analyses

The stability of task characteristics perceptions was assessed with several techniques. First, values of *t* were calculated to investigate mean differences between time 1 and time 2. Next, correlations among variables at both time points were arranged in a multitrait-multimethod format.

Although it should be clearly understood that this analysis was not intended to imply that administering the same instrument to the same group at two points in time necessarily represents a multiple method for measuring task characteristics, the criteria for assessing convergent and discriminant validity (Campbell & Fiske, 1959) are appropriate for assessing the stability of the pattern of task characteristics intercorrelations. That is, if perceptions of task characteristics are stable, in both absolute and relative terms, then measures of task characteristics viewed in this fashion should both converge and discriminate.

The test-retest correlations from this matrix should provide information pertaining to the absolute stability of task characteristics perceptions. Although it is possible for rank-order changes to escape detection with the *t*-test, the magnitude of the time 1–time 2 correlations should provide additional evidence pertaining to absolute stability. The correlation matrix should also provide information concerning the comparative or relative stability of task characteristics perceptions.

The stability of task dimensionality was investigated by factor analytic procedures. Within each time point, the data were factor analyzed and oblique rotations performed. Next, factor congruency coefficients (Harman, 1976) were computed between the two sets of factors and also between each set of factors and the factor analysis results presented by Sims et al. (1976).

To test the stability of reactions to perceived task characteristics, Pearson product-moment correlations were computed between task characteristics and outcome variables at both time points and the significance of their differences assessed via Fisher's *z*-transformations. The extent to which the moderating effects of growth need strength on the task characteristics–outcome relationship are stable was assessed via subgroup analysis. Moderated regression was not used because of interpretation difficulties and because Blood and Mullett (1979) have shown that regression approaches may mask moderating effects that are present. Respondents were classified as high or low growth need strength (GNS) based on a median split on time 1 need strength scores. (It was necessary to include people in the same subgroup at both time points to control for possible differences due to changes in group composition. In supplementary analyses, it was found that subgrouping on time 2 scores yielded essentially the same results. Further, the need strength test-retest correlation of .74 indicates that need strength is relatively stable.) The GNS mean for the high group was 4.26, and for the low group the mean was 2.10. Values for perceived task characteristics and outcome variables within each subgroup then were correlated.

The final issue pertaining to individual reactions to perceived task characteristics is one of causal priorities. Possible causal relationships among variables were assessed through the use of cross-lagged correlations. The correction procedure described by Kenny (1975) was utilized to adjust the cross-lagged correlations for possible reliability shifts from time 1 to time 2. The Pearson-Filon test was used to test for significant differences between correlations (Kenny, 1975).

First, cross-lagged correlations were computed between task characteristics and outcome variables for the total sample. Next, the moderating effects of growth need strength were assessed by subgrouping procedures.

The sample was again divided into two groups, one with time 1 need strength scores above the sample median and the other with time 1 need strength scores below the same median. Cross-lagged correlations then were computed between task characteristics and outcome variables for each subgroup.

RESULTS

Table 1 also presents values of *t* for mean changes in task characteristics perceptions from time 1 to time 2. None of the *t* values for the task characteristics is significant. Further, the largest absolute mean change is only −.24 for autonomy. Other mean changes are .01 for variety, .06 for feedback, and −.08 for identity. These small differences contrast with a range of .62 between the high and low means at time 1 and a range of .32 between the same means at time 2. Hence, mean differences are more apparent for different task characteristics within time points than for the same task characteristics across time points.

Additional insights were gained by examining the patterns of intercorrelations among task characteristics within and across time points. (These intercorrelations, arranged in a multitrait-multimethod matrix, are available from the author.) Evidence for the absolute stability of task characteristics perceptions was found in the monotrait-heterotime diagonal. All correlations were significant at $p < .001$ with a high correlation of .80 and a low correlation of .70. As noted earlier, the lack of mean changes could conceal rank-order changes between time 1 and time 2. The positive correlations, however, do indicate a high degree of stability for each of the four task characteristics.

The more complex issue of comparative or relative stability was assessed indirectly utilizing Campbell and Fiske's (1959) criteria for discriminant validity. The first criterion is that the test-retest correlation for a given task characteristic should be greater than its entries in the heterotrait-monotime triangles. This requirement was met for 14 of 24 possible comparisons. The second criterion is that the test-retest correlations should exceed the corresponding correlations in the heterotrait-heterotime triangles. This criterion was satisfied for all 24 possible comparisons. The final criterion, and for this analysis the most crucial, is that the same pattern of interrelationships should exist in the triangles where correlations were within time points and where correlations were between time points. The Kendall coefficient of concordance (Siegel, 1956) for the four relevant triangles was .60 ($p < .05$). Hence, the final criterion is satisfied. Overall, then, the evidence appears to support the proposition that task characteristics perceptions, in both absolute and relative terms, are somewhat stable.

However, it also should be noted that the four task characteristics were highly intercorrelated within time points. This intercorrelation contrasts with previous findings for both the JCI and JDS. At least two explanations could explain the high correlations. First, common method variance could have caused error attributable to set response patterns. Second, the nature of the jobs studied could be such that each job has consistent degrees of each characteristic. This second explanation is supported by the large standard deviations within time points and the large test-retest correlations across time points.

The factor analysis results generally supported the a priori dimensionality. Four time 1 items and one time 2 item did not load as expected. The eigenvalue pattern supported the four factor solution at both time points. (The results of these analyses also may be obtained from the author.)

Table 2 presents the factor congruency coefficients between the time 1 and time 2 solutions and also between each solution and the original Sims et al. (1976) solution. Harman (1976) indicates that no set procedure exists for interpreting scores, by way of statistical significance or general decision rules. It can be inferred from Harman's examples and discussion, however, that coefficients above .80 are entirely acceptable and coefficients below .50 are unacceptable. Because only 1 of 12 coefficients falls below .80, a high degree of congruence appears to be present.

TABLE 2
Factor Congruency Coefficients

	Feedback	*Autonomy*	*Identity*	*Variety*
Time 1 solution and Time 2 solution	.9224	.9797	.9082	.8968
Time 1 solution and Sims et al. solution	.7342	.8552	.8943	.8462
Time 2 solution and Sims et al. solution	.8723	.8587	.9202	.9364

TABLE 3
Correlations Between Job Characteristics and Satisfaction and Productivity (Time 1 and Time 2)[a]

Job Characteristics	*Productivity*	*Satisfaction with Job*	*Satisfaction with Supervision*
Variety	−.08	.54***	−.10
	−.07	.69***	.03
	(ns)	(ns)	(ns)
Autonomy	.12	.35***	−.25**
	−.07	.71***	−.15*
	(ns)	($p<.001$)	(ns)
Feedback	.01	.40***	−.08
	−.12	.66***	.06
	(ns)	($p<.01$)	(ns)
Identity	.09	.38***	−.13
	−.04	.66***	.01
	(ns)	($p<.01$)	(ns)

[a] Time 1 correlations listed above Time 2 correlations. Levels of significance denoted by asterisk indicate statistical significance of the individual correlations. Levels of significance denoted within parentheses (e.g., $p<.01$) indicate statistically significant differences between the Time 1 and Time 2 correlations. Correlations are for the total sample within each time point.

*$p<.05$
**$p<.01$
***$p<.001$

The second set of questions addressed by this study pertains to the stability of individual reactions (affective and behavioral) to perceived task characteristics. Table 3 presents Pearson product-moment correlations between task characteristics and outcome variables at both time points. No significant correlations were found between task characteristics and productivity at either time point. However, all four task characteristics are significantly correlated with job satisfaction at both time 1 and time 2. Further, the correlations between job satisfaction and autonomy, feedback, and identity all are significantly greater at time 2 than at time 1. This could be due to differences in sample size, error variance, and/or lack of stability. Task autonomy is correlated negatively with satisfaction with supervision at both time points. Overall, then, the data indicate that employee reactions to perceived task characteristics, in terms of productivity and satisfaction with supervision, are relatively stable, but that reactions in terms of job satisfaction are somewhat more complex.

The results of the subgroup analysis for moderating effects are presented in Table 4. No moderating effects are detected at either time 1 or time 2 for productivity or satisfaction with supervision. However, the results pertaining to job satisfaction again are somewhat more complex. At time 1, the moderating effects of growth need strength are present for task autonomy and identity, but not for task variety and feedback. However,

TABLE 4

Correlations Between Job Characteristics and Satisfaction and Productivity as Moderated by Growth Need Strength (Time 1 and Time 2)[a]

	Productivity			*Satisfaction-Job*			*Satisfaction-Supervision*		
Job Characteristics	*High GNS*		*Low GNS*	*High GNS*		*Low GNS*	*High GNS*		*Low GNS*
Variety	.03	(ns)	-.15	.56***	(ns)	.60***	-.24*	(ns)	.13
	.03	(ns)	-.11	.82***	($p<.01$)	.53***	-.03	(ns)	.10
	(ns)		(ns)	($p<.001$)		(ns)	(ns)		(ns)
Autonomy	.15	(ns)	.13	.52***	($p<.05$)	.11	-.26*	(ns)	-.23*
	.09	(ns)	-.12	.72***	(ns)	.73***	-.21	(ns)	-.10
	(ns)		(ns)	($p<.05$)		($p<.001$)	(ns)		(ns)
Feedback	.11	(ns)	-.13	.44***	(ns)	.42***	-.20	(ns)	.15
	.04	(ns)	-.17	.71***	(ns)	.63***	-.06	(ns)	.18
	(ns)		(ns)	($p<.01$)		($p<.05$)	(ns)		(ns)
Identity	.21	(ns)	.07	.52***	($p<.05$)	.18	-.22*	(ns)	.02
	.06	(ns)	-.09	.73***	(ns)	.57***	-.07	(ns)	.11
	(ns)		(ns)	($p<.05$)		($p<.001$)	(ns)		(ns)

[a] Time 1 correlations listed above Time 2 correlations. Levels of significance denoted by asterisk indicate statistical significance of the individual correlations. Levels of significance denoted within parentheses (e.g., $p<.01$) *below* each pair of correlations indicate statistically significant differences between the Time 1 and Time 2 correlations *within* each subgroup. Levels of significance denoted within parenthesis *between* each pair of correlations indicate statistically significant differences between correlations for high and low GNS subgroups *within* time points.

*$p<.05$

**$p<.01$

***$p<.001$

TABLE 5
Corrected Cross-Lagged Correlations Between Job Characteristics and Dependent Variables for High Growth Need Strength Individuals ($n = 54$)

Job Characteristics (x) With Dependent Variables (y)	*Corrected Cross-Lag Correlations*		*Level of Significance Between Correlations*	*Test-Retest Correlations*		*Static Correlations*	
	$r_{x_1y_2}$	$r_{y_1x_2}$		$r_{x_1x_2}$	$r_{y_1y_2}$	$r_{x_1y_1}$	$r_{x_2y_2}$
Job variety with:				.88***			
1. Satisfaction with supervision	.15	−.16	($p < .05$)		.36**	−.25*	−.04
2. Satisfaction with job	.63***	.52***	n.s.		.47***	.57***	.82***
3. Productivity	−.01	−.03	n.s.		.80***	.01	.05
Job autonomy with:				.66***			
1. Satisfaction with supervision	−.04	−.15	n.s.			−.26*	.20
2. Satisfaction with job	.38**	.39**	n.s.			−.55***	−.70***
3. Productivity	.03	.11	n.s.			.13	.07
Job feedback with:				.75***			
1. Satisfaction with supervision	.28**	−.24*	($p < .001$)			−.20	−.06
2. Satisfaction with job	.51***	.26*	n.s.			.41***	.69***
3. Productivity	.06	.07	n.s.			.13	.08
Job identity with:				.78***			
1. Satisfaction with supervision	.09	−.10	n.s.			−.23*	−.08
2. Satisfaction with job	.50***	.44**	n.s.			.54***	.71***
3. Productivity	.05	.15	n.s.			.20	.09

*$p < .05$
**$p < .01$
***$p < .001$

TABLE 6
Corrected Cross-Lagged Correlations Between Job Characteristics and Dependent Variables for Low Growth Need Strength Individuals ($n=53$)

Job Characteristics (x) With Dependent Variables (y)	*Corrected Cross-Lag Correlations*		*Level of Significance Between Correlations*	*Test-Retest Correlations*		*Static Correlations*	
	$r_{x_1y_2}$	$r_{y_1x_2}$		$r_{x_1x_2}$	$r_{y_1y_2}$	$r_{x_1y_1}$	$r_{x_2y_2}$
Job variety with:				.67***			
1. Satisfaction with supervision	.38**	.01	($p<.01$)		.70***	.11	.10
2. Satisfaction with job	.32**	.41**	n.s.		.27*	.59***	.52***
3. Productivity	-.17	.12	n.s.		-.18	-.16	-.10
Job autonomy with:				.77***			
1. Satisfaction with supervision	.17	-.14	($p<.05$)			-.22*	-.10
2. Satisfaction with job	.48***	.02	($p<.01$)			.13	.70***
3. Productivity	-.32*	.12	($p<.05$)			.11	-.10
Job feedback with:				.71***			
1. Satisfaction with supervision	.44**	-.09	($p<.001$)			.14	.18
2. Satisfaction with job	.28*	.25*	n.s.			.60***	.59***
3. Productivity	-.17	.14	n.s.			-.14	-.19
Job identity with:				.81***			
1. Satisfaction with supervision	.22	.04	n.s.			.02	.12
2. Satisfaction with job	.32	.08	n.s.			.19	.58***
3. Productivity	-.11	.16	n.s.			.07	-.09

*$p<.05$
**$p<.01$
***$p<.001$

at time 2, the moderating effects are detected for task variety, but not for task autonomy, feedback, or identity.

The results of the cross-lagged analyses for the total sample suggest possible causal relationships between task variety and feedback and satisfaction with supervision. No causal inference relationships between task characteristics and satisfaction with the job or productivity are suggested by the data. (These results are available upon request.)

Table 5 presents the results for the high growth need strength subgroup. In general, the pattern of relationships is similar to that of the total sample. Table 6 presents the correlations for the low growth need strength subjects. The same relationships detected for the high growth need strength respondents are also present for this subgroup, but the corresponding correlations are larger. Further, additional relationships are suggested involving task autonomy. The data suggest a possible causal relationship between autonomy and satisfaction with the job and productivity, although the latter relationship is negative. That is, the data suggest that, for low growth need strength employees, task autonomy will lead to increased satisfaction with the job but also will lead to decreased productivity.

DISCUSSION

This study investigated the extent to which perceptions of task characteristics and reactions to these perceptions are stable over time. The results suggest that employees' perceptions of their tasks are fairly stable, at least over short time intervals. This finding is consistent with prior research. However, the results also suggest that individual reactions to perceived task characteristics are less stable and more complex than previous research might indicate. These findings carry a number of implications for future task design research.

First, the critical linkage between task perceptions and reactions to these perceptions is in need of additional research. The findings reported here indicate that reactions to perceived task characteristics, both in terms of a direct relationship and as moderated by individual growth need strength, are not stable, even over a relatively short time interval. Hence, this would indicate the need for an expanded view of individual-task interactions.

Griffin (1979, 1980) has suggested that a complex network of relationships may exist among individual, task, and leader behavior variables. The results obtained here from the cross-lagged analysis for the low growth need strength subgroup would tend to support this position. Because one source of task autonomy, for example, is typically an individual's supervisor, then supervisory behavior should be taken into account when investigating autonomy as a task characteristic.

Similarly, Rousseau (1977, 1978) has demonstrated that relationships may exist among such variables as task characteristics and technology, department structure, and positional characteristics. Hence, existing research would seem to indicate the need for an expanded framework of task design research. Such a framework should describe the interrelationships among all facets of the work environment, including not just the task but also work group factors, supervisory behavior, the reward system, and organizational characteristics. The expanded framework should also focus on reciprocal relationships between the task and the individual, probably within the context of imputed job meaningfulness (Taber, 1978). That is, since some individuals probably "add to" their jobs in both a formal and an informal sense—additional duties (self-inspection of output, etc.) and psychological factors (varying degrees of status, importance, etc.)—task design research should take these processes into account.

A final implication to be derived from this study pertains to the appropriateness of performance as an outcome variable in task design research. Hackman (Hackman & Oldham, 1976; Hackman, 1977) has argued that the appropriate matching of individuals and tasks should enhance satisfaction, motivation, and productivity. Further, some research has tended to support predicted relationships among task characteristics and performance (Steers & Spencer, 1977). However, as summarized by Pierce and Dunham (1976), results involving performance generally have been less strongly or consistently supported than have corresponding findings involving affective outcomes.

The present study utilized an objective, quantifiable measure of productivity as a surrogate for overall performance. No significant relationships were found between perceived task characteristics and productivity within or across time points. There are three possible explanations for these findings: (1) The index of productivity utilized by the organization is not a valid measure of individual performance, (2) Task characteristics are not related to productivity, or (3) Task design is but one variable among many that interact to determine performance. That is, taken apart from the other variables, task characteristics may not account for enough variance in performance to reflect a significant correlation. This explanation appears more tenable than either of the other two and reinforces the previous argument for an expanded framework for task design research.

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Job Change and the Middle Seasons of a Man's Life[1]

RAYMOND E. HILL
EDWIN L. MILLER
The University of Michigan

Developmental tasks faced by adults in midlife were found to be related to various criteria in job changing decisions. The establishment period of adulthood as well as the midlife transition were particularly strong influences. These results are discussed from the standpoint of adult development and human resource management.

In recent years there has been increased interest and research in the area of adult development, particularly as it relates to the world of work and occupational experience (Levinson, Darrow, Klein, Levinson & McKee, 1978; Gould, 1972; Schein, 1978; Vaillant, 1977; Van Maanen, 1977). This research reveals adult development as more orderly and lawful than previously suspected and characterizes adult life as a series of developmental periods that have considerable impact on the manner in which people relate to major life decisions.

The particular life decision of interest in this study is job change, an area that also has stirred increased interest in recent years. Organizations are concerned because turnover is often costly and disruptive; individuals are concerned because job change is often stressful (Brett, 1980). Schein states in his recent book on careers:

> What is, from the point of view of the organization, simply a process of "turnover" may be, from the point of view of the individual, a major transition crisis involving a search for one's occupational niche (1978, p. 172).

The present investigation examined the relation between the importance of various job change decision criteria and adult life stage. The study was focused, however, around two stages in midlife that tend to occur primarily between the ages of 35 and 50. The expectation was that the job change

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criteria would vary in importance depending on the life stage of the decision maker in these two "middle seasons." Before the hypotheses and findings are given, however, the adult development model (which is treated as the independent variable) will be briefly described. It is based on Levinson et al.'s (1978) recent discoveries as articulated in their study of 40 men. Their subjects were all between the ages of 35 and 45 and were taken from four different occupations. The foundation of Levinson's theory is that adults are periodically faced with new but *predictable* development tasks over their entire life course and that working through these new challenges is the essence of adulthood. The adult life course is characterized by a continual series of structure building periods followed by structure changing periods in which attempts are made to work some of the "flaws" out of the prior stable phase. What then, is the nature of these developmental tasks?

Levinson et al.'s basic model is briefly summarized below, starting with late adolescence. The age categories are approximate and not rigid. Also, the summary below does not do justice to either the complexity or richness of the basic framework.

I. *Early adult transitional period* (Age 18-22)
Leaving the family of origin is the major task of this period. The young man feels half in and half out of the family. Much energy is expended during this period to reduce dependence on familial support and authority. Peer support becomes critical to this task, but parental control is often replaced by peer control. Marriage, the military, or college often functions as major transitional mechanisms here and symbolize the first step into the adult world.

II. *Getting into the adult world: structure building period* (Age 22-28)
Getting into the adult world on a more secure basis is the prime task of this period. It is usually characterized by exploration and provisional commitments to adult roles, responsibilities, and relationships. The person's energy is primarily absorbed around forming an initial occupational structure as well as forming more mature friendships and relationships. Mentors are often critical during this period in helping the young man learn the proper emotional tone of adult life as well as providing insights around more technical issues. The culmination of this period usually produces an initial life structure involving marriage and occupation. Equally important is the formation and clearer recognition of one's *Dream* which serves as a guiding force and provides idealized images of the man's future life structure.

III. *Age 30 transitional period* (Age 28-32)
In the late 20s and early 30s, one often begins to experience some "flaws" in the initial life structure and begins a transformation process aimed at reworking the initial structure to make up for "what's missing." Marriage and career shifts are common during

this period. Although it is a period of internal instability, the occupational and personal attachments formed during the 20s may be questioned, examined, and then essentially reconfirmed with no apparent external change. A common pattern is for the young man to make a *qualitative* shift in the type of work he does even though remaining in the same occupation, and this often involves the use of prior repressed abilities. He often seems to be "someone else" after the age 30 transition in certain respects, or more accurately "someone more."

IV. *Settling down: structure building period* (Age 33-40)
With a reworked version of his initial life structure, the man is now ready to seek order, stability, security and control. He wants to make deeper commitments and invest more of himself into work, family, and other valued activities. There is an inclination to "sink roots" and strive for upward achievement; making The Dream a reality slowly begins to be an urgent and earnest matter. This settling down period often starts with a variety of illusions, however, the biggest of which is that realization of the Dream will result in unmitigated happiness. Thus toward the end of settling down from approximately 35 to 40, a subperiod emerges that represents a time of peaking and is referred to as Become One's Own Man (BOOM). The usual feeling here is that regardless of what one has accomplished to date, he is not sufficiently his own man. Simultaneously, there often is a strong push to achieve the "career high" and finally "make it" in the occupational world. The man is pining for that crucial promotion (or at least one that seems "crucial"). This key promotion or other recognition that one feels will serve as the final liberating symbol represents an important affirmation by society.

V. *Age 40 transitional period* (Age 38-42)
This is a major structure changing period and represents the turning point between young and middle adulthood. The transition occurs whether one "succeeds" or "fails" in the search for affirmation by society. It is only the shape of this transition that varies. The disparity between The Dream and reality usually triggers considerable soul searching because The Dream has been a guiding force since the twenties. In addition, even considerable success to date may seem hollow or bittersweet. There is an increase in one's awareness of his own mortality and a sense of aging. A major developmental task for midlife is the changing relationship to the self. Self acceptance, regardless of one's plight becomes crucial to a fulfilling life in middle and late adulthood. The tyranny of The Dream is usually given up to a significant degree. Often the man becomes more existential in a sense and is more concerned with happiness in the "here and now." The imagery of "The ladder," which symbolizes achievement and advancement, fades in importance.

VI. *Beginning of middle adulthood: structure building period* (Age mid-40s)
The result of this prior turning point is often a man who is more "individual" or more pronounced in his own individuality and specialness. He is less dominated by the need to win, to be right, to achieve by external criteria, and more concerned about implementing his own particular competence and enjoying his work and life. The key to this turning point lies in accepting one's self, in giving up the tyranny of external evaluations, in seeing reality clearly while being guided more by one's own internal lights. Although the man is capable of greater separateness, he is also capable of greater attachment and concern for other people. Thus, whereas apprenticeship roles are common prior to age 40, mentoring roles acquire increased importance to the man after 40. The developmental process during this period is often referred to as midlife individuation.

Levinson did not study people beyond the age of 45 (beginning of middle adulthood) and thus does not have sound evidence for describing development on into later adulthood; however, he is quite certain that developmental opportunities continue throughout the entire life course.

Of particular interest in the present study was the idea of a "career peak" in the late 30s, followed by a midlife period of lessened competitive pressure.

The underlying model has been suggested by previous research. Vaillant (1977) for instance, notes that the maturational pattern of "career consolidation" followed by a period of "generativity" has been confirmed by the major American studies of adult development. Bernice Neugarten (1964) characterizes the fundamental change at midlife as a process of turning inward toward the self, of heightened introspection, wherein enjoyment of life and work per se increase in importance. Hall, in a synthesis of the literature on work career stages with that of life stages suggests that:

> ...the models resemble general biological growth and decay curves; early period of exploration and trial, then growth, a stable period in the middle (maintenance), and a stage of decline and withdrawal from the work environment (1976, p. 55).

The hypothesis concerning the relationship between job change decisions and life stage revolves around the career peak (Levinson's settling down period) and the following maintenance stage (Levinson's midlife transition).

THE SURVEY

Sample

The data for the study came from a convenience sample of approximately 600 males who had changed jobs recently. The entire readership list of a national business magazine was scanned for persons who had sent in change of address cards within a 3-month period ending in late 1976. This created a group of approximately 4,000 persons who were then sent questionnaires in early 1977 asking whether they had changed *jobs and locale.* Thus the assumption is that most persons had changed jobs within the past three to six months at the time of the survey. However, inasmuch as job change may precede actual geographic relocation, it is possible that the job change occurred earlier for some respondents. The questionnaire asked a variety of questions concerning attitudes and opinions regarding the job change decision. Of the 4,000 persons polled, aproximately 690 responded, but only about 600 were usable from the standpoint of complete data. Thus the effective response rate was approximately 15 percent. This 15 percent is admittedly low, but it may be an underestimate. Many persons who sent in a change of address notice may not have necessarily changed jobs.

Whether the sample is particularly representative of the population of managerial job changers is open to question, at any rate. It also should be noted that job change may be more frequent in some age groups than others (i.e., age 30 transition versus establishment). Thus it is not known whether the sample is equally representative for all age categories. Nevertheless, the fit between the data and the underlying theoretical model was of striking interest to the authors, and it provided the impetus to pursue the study in spite of obvious sampling limitations.

Table 1 shows a breakdown of the respondents by the level of their current position and educational background. The respondents were asked to give their ages in categories, roughly corresponding, as it turned out, to Levinson's developmental periods.

The Variables

In addition to other questions, the participants were asked to indicate on a 5-point Likert-type scale the importance or amount of influence the

TABLE 1
Level of Current Position and Educational Background

	Percent	*N*
Level		
Vice presidential or higher	25	148
Divisional or subsidiary management	14	83
Middle management, administrative	21	124
Middle management, engineering or manufacturing	20	118
Middle management, marketing or sales	9	53
Nonmanagerial	11	65
	100	591
Education		
Ph.D. or LLB degree	7	41
Master's degree	29	171
Some graduate work	23	136
Bachelor's degree	27	160
Some college	11	65
No college	3	18
	100	591

following factors had on their decision to change jobs (1 = least important and 5 = most important). These factors represent a subset of the 10 most relevant dimensions from a larger set of 15.

1. Opportunity for greater responsibility
2. Special qualifications for job
3. Opportunity to become more visible
4. Experience for future assignments
5. Proven performance in this area of work
6. Particular geographic location of the job
7. Good background for top management
8. Increase promotion potential
9. Relative state and local taxes, new and old locale
10. Relative other cost of living, new and old locale

These particular decision criteria were the result of research done in a variety of prior settings. Bassett and Myers' (1968) work on the selection decision process represents the basic contribution to the contruction of the instrument. They concerned themselves with isolating various behaviors of personnel decision makers and used the data derived from an interview study to develop the questionnaire. In an extension of this selection process research to the international setting, Miller (1972) studied the decision behavior of managers selecting Americans to go abroad. More recently, Miller and Cheng (1976) concentrated their attention on the circumstances that influence Americans to accept overseas assignments. The questions used in the current study are a modified version of the instrument used by Miller and Cheng in their investigation of the overseas job change.

The age categories from the questionnaire were as follows: (1) below 30, (2) 30-34, (3) 35-39, (4) 40-49, (5) 50 and over. Levinson's age periods were not rigid with respect to their boundaries. It thus was felt that the above categories could capture the essential dynamics of the various periods with category (1) representing entry into the adult world, category (2) as the age-30 transition, and category (3) as the settling down and BOOM period. Category (4) combines the transition and entry into middle adulthood, and category (5) represents firm establishment in middle adulthood.

Hypotheses

The prior expectation was that life stage would be related to the importance attached to the various job change decision criteria. In particular, the following hypothetical relations were of interest.

1. Career peak hypothesis: *The career oriented variables that reflect increasing decision making power and responsibility will peak in importance during age category 3 (35-39 yrs., the settling down and BOOM period).* These variables include: opportunity for greater responsibility, opportunity to become more visible, experience for future assignments, good background for top management, and increased promotion potential.

2. Midlife individuation hypothesis: *The noncareer oriented variables that reflect immediate job and life concerns will be at their maximum during age category 4 (40-49 yrs., the midlife transition and maintenance).* These variables include: special qualifications for job, proven performance in this area of work, particular geographic location, relative state and local taxes, and relative cost of living.

It should be noted that this is not a complete test of Levinson's framework as it relates to job change, but rather it is only an examination of two periods (settling down and midlife transition). However, the influence of these two periods can be known only by comparing all five periods, because both hypotheses involve relative maxima on the decision criteria. Furthermore, age category 4 does not fit Levinson's model as well as do the others. The model focuses on ages 40-45, whereas data in the present study involve ages 40-49. It was felt, however, that the influence of the midlife transition could be captured by the 40-49 age bracket for two reasons. First, Levinson does not view the age categories as completely rigid in terms of their boundaries and, second, the midlife transition is described as the single most potent developmental period in terms of its influence on adult personality. A last important qualifier on these hypotheses is that they pertain only to the job change decision and as such reflect only a narrow slice of the work, personal, and family issues articulated by Levinson's model. In other words, the job change decision is merely one derivative of Levinson's framework, and the present study certainly cannot be viewed as a comprehensive empirical test of its total validity.

Analytical Procedures

Average importance ratings on the decision criteria for each hypothesis were calculated by age category, and the mean vectors were compared using multivariate, one factor analysis of variance (MANOVA) where age

TABLE 2
Intercorrelations of Dependent Variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Greater responsibility	—									
2. Special qualifications	.31	—								
3. More visibility	.32	.16	—							
4. Experience for future assignments	.32	.14	.28	—						
5. Proven performance	.21	.44	.08	.13	—					
6. Geographic location	−.16	.02	−.14	−.18	.01	—				
7. Background for top management	.23	.10	.21	.30	.13	−.02	—			
8. Promotion potential	.38	.09	.30	.38	.10	−.05	.44	—		
9. State and local taxes	−.13	.08	−.07	−.09	.11	.28	.01	.04	—	
10. Cost of living	−.08	.11	−.05	−.06	.07	.33	.02	.02	.83	—

$r > .08, p < .05$
$r > .11, p < .01$

categories represented levels of the factor. MANOVA was selected for comparing the means because there were significant intercorrelations among the 10 variables. The intercorrelations of the dependent variables are presented in Table 2.

Following the two MANOVAs (one for each hypothesis) all 10 variables were grouped together and subjected to multiple discriminant analysis in an effort to interpret the underlying multivariate data structure. Although this followup procedure to MANOVA has its critics, it is established enough by other researchers to be useful in the present context (Spector, 1977; Borgen & Seling, 1978; Cooley & Lohnes, 1971).

RESULTS

Multivariate Analysis of Variance

Tables 3 and 4 show the MANOVA analysis for each hypothesis and include the means for decision criteria by age category, sample sizes, degrees of freedom, and the approximated *F* statistic. This analysis indicated that the observed differences in the mean vectors across age periods were statistically significant beyond the .0001 level in both cases. Pairwise comparisons of strata for the career peak hypothesis indicated significant differences ($p < .01$) between each stratum and stratum 5. For the midlife individuation hypothesis, significant differences were observed between 1 vs. 4, 1 vs. 5, 2 vs. 4, 2 vs. 5, 3 vs. 4, and 3 vs. 5.

TABLE 3
MANOVA on Career Peak Variables by Developmental Age Period

	Age Categories				
	(1) Entry into Adult World (30 and under)	*(2) Age 30 Transition (31-34)*	*(3) Settling Down and BOOM (35-39)*	*(4) Midlife Transition and Entry to Middle Adulthood (40-49)*	*(5) Establishment in Middle Adulthood (50 and over)*
1. Opportunity for greater responsibility	4.10	4.23	4.44	4.23	4.11
2. Opportunity to become more visible	3.46	3.60	3.59	3.44	3.48
3. Experience for future assignments	4.16	4.19	4.21	4.04	3.72
4. Background for top management	2.88	2.95	3.02	2.97	2.75
5. Increase promotion potential	3.89	3.97	3.99	3.71	3.18
Sample size	107	142	109	135	70

df = 20,1834
$F = 2.78$
$p < .0001$

TABLE 4
MANOVA on Midlife Individuation Variables by Developmental Age Period

	Age Categories				
	(1) Entry into Adult World (30 and under)	*(2) Age 30 Transition (31-34)*	*(3) Settling Down and BOOM (35-39)*	*(4) Midlife Transition and Entry to Middle Adulthood (40-49)*	*(5) Establishment in Middle Adulthood (50 and over)*
1. Special qualifications	3.48	3.51	3.62	3.76	4.01
2. Proven performance in this area of work	3.27	3.43	3.60	3.73	3.97
3. Geographic location	3.23	3.17	3.03	3.20	3.01
4. State and local taxes	2.29	2.15	2.07	2.54	2.36
5. Cost of living	2.43	2.30	2.21	2.71	2.51
Sample size	112	146	116	143	77

df=20,1931
$F=2.93$
$p<.0001$

TABLE 5
Discriminant Analysis Results

			Significance of Discrimination			
Discriminant Function	*Eigenvalue*	*Percent Variance*	*Discriminant Functions*	χ^2	*df*	*Sign Level*
1	.19	78.1	1, 2, 3, 4	126.5	40	.001
2	.03	12.1	2, 3, 4	29.3	27	NS
3	.02	8.8	3, 4	13.3	16	NS
4	.002	1.0	4	1.1	7	NS

Discriminant Function Analysis

Table 5 shows the overall results of the discriminant analysis. Function 1 accounted for 78.1 percent of the discriminable variance and was significant at the .001 level. Functions 2, 3, and 4 were not statistically significant and will not be continued in the analysis. Table 6 shows the structure matrix, which is the correlations between the dependent variables and the linear compound represented by the discriminant function. The standardized discriminant weights were not shown because intercorrelations among the dependent variables compromise the usefulness of the standardized weights for interpretation purposes. In interpreting the structure matrix, the pattern, sign, and magnitude of the correlations will be considered. The mathematical bases of discriminant and factor analyses are somewhat different, but they present analogous interpretational issues. (In fact, the logic for constructing the structure matrix in the first place derives from factor analytic practices.)

Inspection of function 1 in Table 6 suggests that the maximal differentiation among the groups on job change criteria revolves around *positive* *loadings* on special qualifications (.54), proven performance (.52), state and local taxes (.25), and cost of living (.24), but *negative loadings* on promotion potential (–.58) and experience for future assignments (–.41). In fact *all* the career peak variables have negative loadings, whereas all the individuation variables except geographic location have positive loadings. Function 1 could be tentatively labeled Implementation of Special Competence versus Promotion Potential. This structure is further clarified by an illustration of the group centroids in discriminant space. Table 7 shows the group centroids on Function 1. The group centroids are clearly ordered in accordance with increasing age, with groups 4 and 5 (midlife transition and establishment) becoming distinctly different. This suggests that implementation of special competence and a lessening of promotion potential become important differentiators of job change after 40 years of age. Groups 1, 2, and 3 tend to be clustered together on the negative side of the axis (concern for promotion potential), whereas groups 4 and 5 move decidedly toward the positive side, which represents implementation of special competence. In this regard, it should be noted that group 5 makes the

TABLE 6
Discriminant Structure Matrix

Variable	*Discriminant Function* *1*
1. Opportunity for greater responsibility	–.09
2. Opportunity to become more visible	–.09
3. Experience for future assignments	–.41
4. Background for top management	–.08
5. Increase promotion potential	–.58
6. Special qualifications	.54
7. Proven performance in this area of work	.52
8. Geographic location	–.05
9. State and local taxes	.25
10. Cost of living	.24

TABLE 7
Centroids for Five Groups on One Discriminant Function

Group	*Discriminant Function (Implementation of Special Competence vs. Promotion) Potential* *1*
1. Under 30 years Entry into adult world	–.49
2. 31-34 years Age 30 transition	–.47
3. 35-39 years Establishment and BOOM	–.33
4. 40-49 years Midlife transition and entry to middle adulthood	.15
5. 50 and over years Establishment in middle adulthood	.81

most dramatic movement of all groups *away from* promotion potential and *toward* special competencies as the bases on which job change is predicated. The distance between group 4 and group 5 is slightly larger, for instance, than the distance between group 1 and group 4. The discriminant analysis thus lends strong intuitive (and statistical) support to the midlife individuation hypothesis.

DISCUSSION AND CONCLUSIONS

There is clear support for the career peak phenomenon in job change decisions (Hypothesis 1). All five of the hypothesized variables peaked for age category 3 (establishment and BOOM), as indicated in Table 3. Hypothesis 1 also is partially supported by examination of group 3's centroid position on the discriminant function (Table 7); a smaller value on function 1 indicates concern for promotion potential. However, groups 1 and 2 are lower than group 3, and thus the discriminant vector does not separate the groups in strict accordance with the career peak phenomenon.

Generally, however, the data peak as expected, and provide empirical validation of Levinson et al.'s (1978) adult development framework as it pertains to occupational experience during the establishment period. In addition, the career peak data are corroborative of what is considered to be a generally agreed upon model of adult personality change. Neugarten (1964) summarizes this by describing research in which men prior to age 40 view the world as achievement-demanding and are content to devote themselves to those demands. After 40 years of age, an increase in self-awareness and preoccupation with one's emotions emerges. In commenting on the change from the 30s to 40s, she notes:

> The basic nature of the age change appeared to be a movement from an active, combative, outer-world orientation to the beginning of an adaptive, conforming, and more inner-world orientation (1964, p. 196).

The midlife individuation hypothesis also has substantial support when the MANOVA and discriminant results are taken together. The economic advantage variables of localized taxes and cost of living peak for group 4 in accord with the expectation. Geographic location as a decision criterion had a dual peak, once in category 4 and again in age group 1. It is of interest that "special qualifications for the job" and "proven performance in this area of work" peaked not in group 4, but in group 5 (those 50 years of age and older). This suggests that the process of midlife individuation as it is expressed around the job change decision continues on far beyond the age 40 transition. Because Levinson et al. (1978) did not study men beyond the age of 45, hypotheses for the present study were not guided by an empirically grounded theory for group 5. The data presented here perhaps suggest further elaborations of the theory.

That groups 4 and 5 are more oriented toward implementing their special competence and are less promotion oriented is strongly indicated by discriminant function 1, which clearly separates groups 4 and 5 from the others and is statistically significant.

Midlife individuation appears analogous to the principle of increasing differentiation in general systems theory (Katz & Kahn, 1978). If human personality is viewed in systemic terms, the tendency to implement increasingly personalized competencies through work would seem to be a corollary of this generalized differentiation process.

Hall also provides useful insights on the underlying mid-career dynamics from a socialization perspective by suggesting that:

> Later career development is more a process of *individuation* than socialization. The person becomes more of his or her own socializing agent. The person pursues more a "Protean" or self-directed career (1979a, p. 1).

In a related paper he further notes how the 20-year follow-up of the AT&T management progress study found an increasing tendency for people to "be themselves" (Hall, 1979b). Mid-career change was interpreted by Hall as a balance restoring mechanism wherein the man attempts to get back to his original "dream" after being nudged away from it through the adaptational demands of early career experiences. In earlier career stages, the individual may feel more need to comply with organizational socialization demands, perhaps at the expense of his own sense of identity. Thus, midlife individuation could be conceptualized as homeostatic processes that protect the individual's integrity (health?) (Brett, 1980), particularly if human personality is again viewed from a systems theory perspective.

The major limitations of the present research are two: first, the study has a cross-sectional design, which creates attributional problems. Perhaps these particular samples just happened to use different decision criteria because they were subjected to different socio-historical influences that were related to age, but not caused by it. The middle-aged cohorts undoubtedly have more financial resources at their command and perhaps can literally "afford to be themselves" (individuation). If the younger groupings had the same economic resources, would they behave more like the older age grouping? Midlife is also a time when health problems rise sharply. Would the younger cohorts be more existential in their outlook given a higher incidence of health related problems? Furthermore, it is quite possible that it is not age per se, but rather work and career experience that creates midlife changes. Johnny Miller is a talented professional golfer who rose to the pinnacle of the highly competitive golfing world in 1974 at the age of 27. Then, shortly thereafter, at the age of 29 he went into a mysterious slump which has plagued him for some three years now. At age 30 when asked to reflect on his downward slide, he related how he had been playing golf under high pressure competitive conditions for *20 years!* Most people do not fully launch a managerial career until their late 20s, let alone reach the zenith of their profession. What appears to be predictable midlife change may be as much a function of the structure of managerial occupations. The wear and tear of competition and the need for some respite simply may not occur with any significance until around age 40 when the typical person has had 10 or 15 years of experience. (On the other hand, adult development theorists might interpret Johnny Miller's slump as a derivative of the age 30 transition.)

What is needed is a panel study in which the *same* respondents are studied at different points in time. But, even then, age as a causative factor cannot be completely untangled from the confounding effects of economic and socio-historical forces. Nevertheless, the age related differences in decision criteria are believed to be part and parcel of the developmental tasks suggested by adult personality theorists, the latest of whom are Levinson et al. (1978). The underlying theoretical framework has a variety of longitudinal precursor studies, which create more confidence around this attributional issue.

The second research design limitation is that the data are post-decision impressions regarding why people made particular choices and, as such, are subject to potential distortion. The question remains, however: Why would people systematically distort the decision criteria in ways that conform to adult development theory? The conclusion is that there is essential validity to the underlying model, and post decision processes cannot alter the fundamental influence of the particular developmental period. The positive aspect of this particular research design is, of course, its efficiency and low cost relative to the sample size. It would be extremely difficult to find and follow this many job changers on a longitudinal basis; yet longitudinal designs must be a part of future research in this area.

Finally, some note of the practical implications of the present data is in order. It appears that the job change decision is influenced by the developmental tasks the person is working on as an adult and is therefore likely to have high personal significance for the individual. It would seem that simply understanding the process of adult development generally would be of value to personnel and human resource specialists if organizations are to become fuller agents of human development. For one thing, it might make organizations more sensitive to the unique meanings job changes can hold for the individual, and thus provide insights that would result in retaining valued persons. It could also lead to fuller counseling dialogues between human resources specialists and employees regarding how to adapt more readily to the occupational world generally, a function which may become more important in an ever mobile society. Manfred Kets de Vries (1978), in a psychoanalytic exploration of mid-career issues, argues strongly for the importance of an expanded counseling function aimed directly at mid-career problems.

Schein also articulates this expanded role for human resource management which the authors believe merits a long concluding quote:

> Any human resource planning and development system must attempt to match the needs of the organization with those of the individual. If such a system is to work, much more effort must be devoted to fully understanding the needs and characteristics of the individual. Those needs derive not only from the individual's working life, but also from the *interaction* within the total "life space" of issues of work, family and self-development. One of the weaknesses of traditional employee and management development systems has been the tendency to assume that employees can be conceived of as leaving family and self at home when they come to work and that, therefore, the organization need worry only about creating opportunities for *work*-oriented development activities. As the study of adult development progresses, it is becoming more and more clear that work, family and self-concerns interact strongly within people throughout their lives. This interaction simply cannot any longer be ignored (1978, p. 17).

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A Test of the Validity of the Multiplicative Hypothesis of Expectancy-Valence Theories of Work Motivation[1]

HUGH J. ARNOLD
University of Toronto

Although all versions of the expectancy-valence model of work motivation hypothesize multiplication of expectancies and valences, a methodologically adequate test of the validity of the multiplicative hypothesis has not been carried out. The research reports an initial test of the validity of the multiplicative hypothesis. Results provide general support for the interaction of expectancy and valence in the determination of motivational force.

Expectancy-valence models have had a pervasive influence on the study of motivation in organizations. Vroom (1964) hypothesized that the force acting upon an individual to engage in an activity is a function of the sum of the products of the valences of all outcomes and the expectancies that the activity will lead to the attainment of these outcomes. The theory then predicts that the individual will choose to perform that activity having the strongest positive or weakest negative force.

Since its statement by Vroom, the theory has been revised, modified, and extended by a number of authors. The distinction between first- and second-level outcomes has been clarified by Galbraith and Cummings (1967), Graen (1969), and Lawler (1973). Campbell, Dunnette, Lawler, and Weick (1970) have presented a detailed and extended "hybrid" expectancy model that introduces a distinction between task goals and first-level outcomes. The distinction between intrinsic and extrinsic rewards drawn by Galbraith and Cummings (1967) has been further elaborated by House (1971), who distinguishes two different types of intrinsic valence. These suggested revisions essentially have involved the postulation of additional relevant independent variables for the model and the more precise specification and differentiation of different classes of expectancies and valences. However, none of the proposed modifications has suggested an alternative to the basic hypothesis of multiplication of appropriate expectancies and valences.

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In addition to theoretical development, two important points have been raised regarding methodological prerequisites of an adequate test of the validity of the theory. Schmidt (1973) has pointed out that the multiplicative process hypothesized by expectancy theory requires ratio scale measures of expectancy and valence for an adequate test of the model. More accurately, Schmidt demonstrates that tests of the model using zero-order correlation techniques are ambiguous and misleading if the rational zero points of the scales of expectancy and valence are unknown.

Mitchell (1974) makes the point that expectancy theory is a within-subject choice model. The theory purports to explain the determinants of the motivational force on an individual to engage in alternative acts, and it subsequently predicts that the individual will choose to perform that act having the highest positive or lowest negative force. Between-subjects designs are criticized by Mitchell as inappropriate tests of the model. Valid tests of the model must employ the single subject as the unit of analysis and must take into account the force acting upon the individual to engage in alternative actions.

Recently a number of studies have employed within-subjects designs (Parker & Dyer, 1976; Matsui, Kagawa, Nagamatsu, & Ohtsuka, 1977; Matsui & Ohtsuka, 1978). Their results generally have been supportive of the expectancy model. However, none of these studies has addressed the scaling issue raised by Schmidt. All of these within-subjects studies have obtained direct self-reports of subjects' valences and expectancies of attaining outcomes as a result of engaging in alternative actions, and they subsequently have computed motivational force scores by taking sums of products of these expectancies and valences. As there is little likelihood that the self-report measures employed in these studies are in fact on ratio scales, the resulting force scores must be viewed as ambiguous and subject to the forms of bias outlined by Schmidt.

The literature thus leads to the conclusion that a methodologically adequate test (i.e., employing appropriate measures, statistical methods, and unit of analysis) of the validity of the multiplicative hypothesis of expectancy theory has not been carried out. The need for such a test is considerable in that: (a) all formulations of expectancy theory hypothesize a multiplicative process and (b) empirical research to date has not demonstrated the superiority of the multiplicative model to simpler additive models (Sheard, 1970; Mitchell & Knudsen, 1973; Lawler & Suttle, 1973; Lawler, Kuleck, Rhode, & Sorensen, 1975).

There are three methodological routes to a valid test of the multiplicative hypothesis. The first, suggested by Schmidt, is the development of a priori ratio scales of expectancy and valence. Ratio scale development techniques are controversial, complex, and extremely time consuming. More to the point, perhaps, they are both unnecessary and insufficient for testing a multiplicative model. They are unnecessary because analytic techniques exist that permit valid tests for interaction without ratio scales. They are insufficient in that even with ratio scales, analytic techniques must be employed that permit a demonstration that the hypothesized product of variables accounts for additional unique variance over and above the linear (main) effects of the variables.

The remaining two approaches are similar in that they both involve application of the general linear model to test for the existence of interaction, but they differ slightly in their implications for experimental design. The second route then involves application of the hierarchical multiple regression techniques developed by Cohen (Cohen, 1968, 1978; Cohen & Cohen, 1975). Arnold and Evans (1979) have shown how such techniques can be applied to the expectancy model and demonstrate empirically that such techniques permit valid tests for multiplicative models with interval or ordinal scale data. The third methodological option involves application of the information integration and functional measurement methodology developed by Anderson and his colleagues (Anderson, 1970, 1974, 1976; Anderson & Shanteau, 1977). This methodology uses the single subject as the unit of analysis, requires no more than categorical scaling of the independent variables (a priori), and permits both graphical and direct statistical tests of the validity of the multiplicative hypothesis. This final method was employed in the design and analysis of the present study because it meets the methodological requirements for a valid test of the multiplicative hypothesis of expectancy theory so well (Arnold, 1976).

METHOD

Subjects judged the strength of their motivation or inclination to accept one of two full-time jobs, Job X and Job Y. For each item, the subject was asked to imagine himself in a situation in which he had been offered both jobs and had to make a decision regarding which of the two jobs he was most inclined to accept. The subject was told to assume that:

1. The two jobs were very similar.
2. He had equal ability to perform both jobs.
3. He could expect both jobs to lead to equal outcomes except for the information contained in each item.

Each item then provided the subject with information regarding the probability of a single outcome occurring as a result of choosing Job X and the probability of a different outcome occurring as a result of choosing Job Y. Subjects indicated their inclination to accept one or the other job on a continuous response scale separating the two jobs. Details of the stimulus design, instruments employed, and experimental procedure are discussed below.

Stimulus Design

The design employed was a $(5 \times 5) \times (2 \times 3)$ factorial with five levels of expectancy and five levels of valence associated with Job X and two levels of expectancy and three levels of valence associated with Job Y. Verbal probability statements were employed to convey levels of expectancy. The five probability statements associated with Job X and the two associated with Job Y are shown in Table 1, along with the subjective probability range of each statement reported by Shanteau (1974). The five levels of expectancy for Job X were chosen to span the range from 0.0 to 1.0 in approximately equal steps. Two intermediate levels were chosen for Job Y.

Levels of valence were operationalized by statements of real job outcomes. The outcomes employed in constructing the items for each subject were selected by the subject from the list of 14 job outcomes contained in Table 2.

Each subject selected from this list the two outcomes that he personally valued most positively, moderately positively, moderately negatively, most negatively, and the two to which he was indifferent. The five levels of valence for Job X then were operationalized for each subject by employing five outcomes that the individual subject had rated as most positive,

TABLE 1
Probability Statements Employed with Associated Subjective Values from Shanteau (1974)

Job X		Job Y	
Probability Statement	*Subjective Value*	*Probability Statement*	*Subjective Value*
No chance	.00		
Somewhat unlikely	.27-.34	Unlikely	.18-.19
Not quite even chance	.45-.50	Better than even chance	.60-.66
Fairly likely	.69-.72		
Sure thing	1.00		

TABLE 2
Job Outcomes

1. Receiving a 50% salary increase during the first year.
2. Receiving frequent criticism from your boss in front of others.
3. Having frequent opportunities to work overtime for double pay.
4. Getting an important promotion during the first year.
5. Being transferred to a new location during the first year.
6. Going to sleep frequently on the job due to boredom.
7. Having an accident involving serious physical injury.
8. Having an attractive female supervisor.
9. Having frequent opportunities for foreign travel during the first year.
10. Being laid off during the first year.
11. Having co-workers who are difficult to get along with.
12. Receiving a $1000 bonus for outstanding performance during the first year.
13. Becoming totally absorbed in your job 24 hours a day.
14. Receiving frequent constructive feedback from your supervisor.

moderately positive, indifferent, moderately negative, most negative. The three levels of valence for Job Y were operationalized by three different outcomes from the list rated by the subject as most positive, indifferent, most negative. The method of operationalizing levels of valence thus differs from most studies of expectancy theory in that level and type of outcome are confounded.

The full factorial $(5\times5)\times(2\times3)$ design resulted in a questionnaire consisting of 150 items. As only 6 unique combinations of expectancy and valence were employed associated with Job Y, each combination appears 25 times in the full questionnaire. In order to assure that subjects were always forced to attend closely to and process the stimulus information regarding Job Y in each item, an additional 14 dummy items were included in the questionnaire employing different levels of probability and different outcomes for Job Y from those included in the factorial design. The questionnaire was thus 164 items in length.

Subjects

The subjects were 31 undergraduates, 16 females and 15 males, registered in undergraduate psychology courses. Participation was voluntary. Subjects were run individually for four sessions of 45 minutes to one hour on separate days. Subjects were paid at the rate of $2.50 per session and received the total payment of $10 at the conclusion of the fourth session.

Procedure

Subjects were recruited from four undergraduate psychology courses. The experimenter attended one class in each course and at the conclusion of the lecture briefly described the nature of the research and explained what would be required of subjects. Students interested in participating stayed behind at the conclusion of the presentation and were asked to complete the Job Outcomes Questionnaire. This questionnaire lists the 14 job outcomes contained in Table 2 and asks the respondent to select the two outcomes that he personally values: (1) Most positively; (2) Next most positively; (3) Most negatively; (4) Next most negatively; (5) Neither positively nor negatively.

After completing the Job Outcomes Questionnaire each subject was individually scheduled for four one-hour testing sessions. The sessions were scheduled on consecutive days for the majority of subjects. All subjects completed all four sessions within a one-week period.

A computer program was written that generated an individualized set of questionnaires for each subject based on responses to the Job Outcomes Questionnaire. Five outcomes, one from each of the above five categories, were employed as the five levels of valence for Job X. The remaining most positive, most negative, and most indifferent outcomes served as the three levels of valence for Job Y. The appropriate outcomes selected by each subject constituted the input data to the program. The program then generated four copies of the Job Preference Questionnaire for each subject, one for use in each testing session. Each copy of the questionnaire contained the 150 individualized items of the $(5 \times 5) \times (2 \times 3)$ factorial design employing only those job outcomes selected by the subject plus the 14 dummy items. Each copy of the questionnaire contained the subject's name and the session number on the first printout page. The questionnaire employed on the first day of testing contained detailed instructions to the subject regarding the nature of the choice situation and the type of judgment to be made in response to each item. Also included were a sample item and five practice items.

Figure 1 contains a sample item from the Job Preference Questionnaire. Each item contains information regarding the probability of Job X leading to one outcome and the probability of Job Y leading to a different outcome. The probability statement and the job outcome were underlined. Each item was followed by a response scale 15 centimeters long labeled Job X at one extreme and Job Y at the opposite extreme. The midpoint of the response scale was indicated with a slash. The subject was asked to respond to each item by placing a vertical mark on the line separating Job X and Job Y at the point best indicating his inclination toward taking one or the other job. Subjects were told to try to make use of the entire length of the continuum by placing their response at the exact point on the line best indicating their inclination toward taking one or the other job. Subjects were told to consider each item as describing a totally new and different situation, and to make their judgment for each item based *only* on the information in that item.

FIGURE 1
Sample Item from the Job Preference Questionnaire

For each item place a mark on the line between Job X and Job Y at the point which best indicates your inclination toward taking one or the other job.

Job X is *a sure thing* to lead to *receiving a 50% salary increase during the first year.*	Job Y has a *better than even chance* of leading to *having co-workers who are difficult to get along with.*

Job X |——————————|——————————| Job Y

NOTE: Not to scale.

The first four items of each questionnaire were extreme valued items employed to anchor the scales. The remaining 160 items were printed in random order by the computer program.

Responses were scored by measuring the distance from the left-most extreme of the response scale to the point indicated by the subject to the nearest millimeter. Responses thus could take on values from 0 to 150, with a score of 75 indicating no preference for one job over the other.

Upon arrival for the first day's testing subjects were presented with their individualized Job Preference Questionnaire for session 1 and told to read through the instructions and respond to the practice items. At the conclusion of the instructions subjects were asked to explain to the experimenter in their own words the nature of the judgments to be made in responding to each item. Subjects then completed the full 164 item questionnaire. In days two through four subjects explained the task in their own words to the experimenter prior to responding to the complete set of 164 randomly ordered items. The majority of subjects required approximately 40 minutes to complete the questionnaire in each session.

RESULTS

The design employed permits both a graphical and an exact statistical test of the validity of the expectancy theory hypothesis of multiplication of expectancy and valence. In the graphical test, if the multiplicative hypothesis is valid, plots of motivational force as a function of levels of expectancy for different levels of valence should form a diverging fan. Nonparallelism of the curves indicates the presence of a multiplicative process.

In addition to this graphical test, an exact test of goodness of fit is available from the analysis of variance. If the multiplicative hypothesis of expectancy theory is valid, the two-way $E \times V$ interaction should account for a significant amount of unique variance over and above the main effects of expectancy and valence. In addition, however, all of this interaction should be concentrated in a single degree of freedom corresponding to the bilinear (linear × linear) component. The two-way $E \times V$ interaction effect in the analysis of variance contains all combinations of E and V, e.g., $E \times V^2$, $E^2 \times V^2$, $E^4 \times V^3$, and so on. Interest here is only in the linear × linear component corresponding to $E^1 \times V^1$ hypothesized by expectancy theory. Methods for computation of the bilinear component are described by Anderson (1970, 1974) and Arnold (1976).

The within-subjects design employed in this research presents certain problems in reporting results economically. Each of the 31 subjects serves as a single unit of analysis, and the graphical and statistical tests of the expectancy model just described are carried out for each subject individually. However, space limitations obviously prohibit detailed reporting of the results for each of the 31 subjects. As a result, in reporting the results below, characteristics of individual responses are briefly described, patterns for subgroups of subjects are outlined, and averages of the individual level analyses are reported to provide an overall summary of the nature of the findings.

Graphical Analysis

The design permits two graphs to be plotted for each subject. First, the combined effects of Expectancy X (the expectancy of obtaining the outcome associated with Job X) and Valence X (the valence of the outcome associated with Job X) on the subject's responses (resultant force) is plotted, collapsing over all combinations of Expectancy Y (the expectancy of obtaining the outcome associated with Job Y) and Valence Y (the valence of the outcome associated with Job Y). A second plot is obtained of the combined effect of Expectancy Y and Valence Y, collapsing over all levels of Expectancy X and Valence X. For all 31 subjects, these two graphs exhibit significant nonparallelism, that is, the data plot as a diverging fan in accordance with a multiplicative hypothesis.

In order to provide a summary of responses for the whole sample, the means of the individual level analyses were obtained and plotted. These summary plots for the whole sample are contained in Figures 2 and 3.

Figure 2 plots the combined effect of Expectancy X and Valence X on subjects' responses (resultant force). The spacing of levels of Expectancy X along the horizontal axis corresponds to the marginal means associated with each of the probability statements. These marginal means serve as provisional estimates of scale values of the levels of expectancy (Anderson, 1974). Levels of Expectancy X are coded in Figure 2 as follows: 1 = No chance; 2 = Somewhat unlikely; 3 = Not quite even chance; 4 = Fairly likely; 5 = Sure thing.

Each curve corresponds to a level of Valence X (an outcome) and is coded as follows: 1 = Most positive; 2 = Moderately positive; 3 = Indifferent; 4 = Moderately negative; 5 = Most negative.

Responses were coded such that 0 (zero) corresponds to maximum motivation to choose Job X, 150 corresponds to maximum motivation to choose Job Y, and 75 indicates indifference. Thus, the smaller the response magnitude, the stronger was the inclination to accept Job X rather than Job Y, and vice versa.

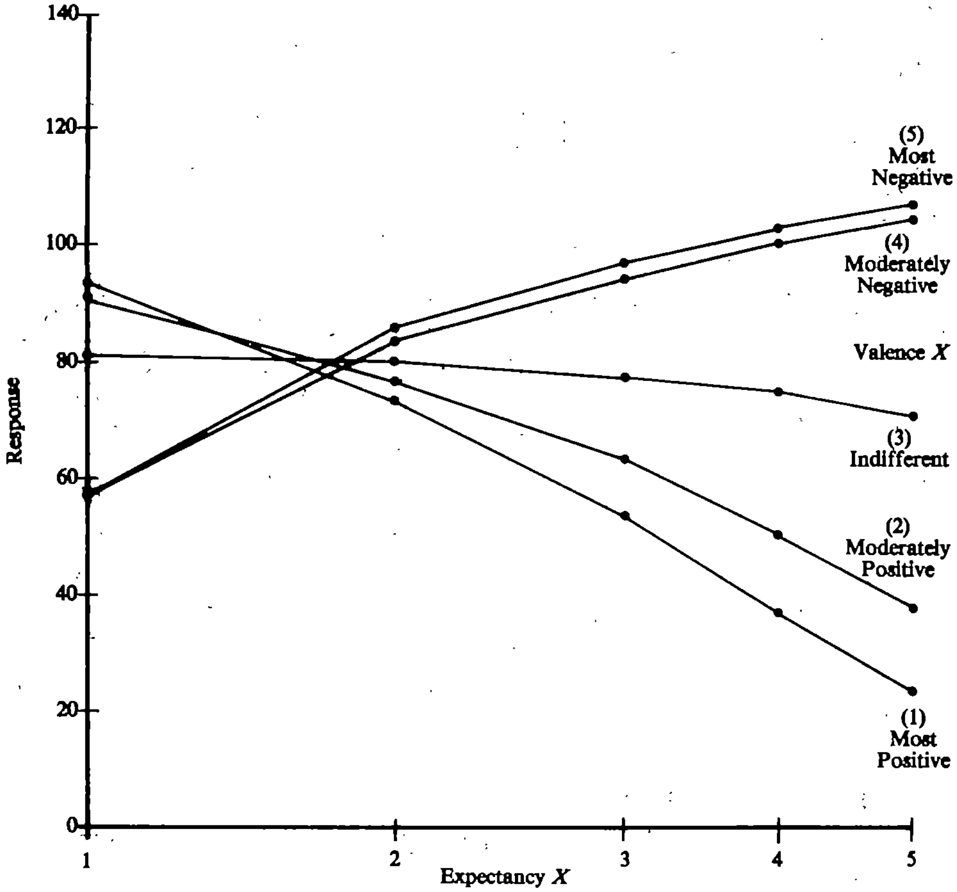
Figure 3 plots the combined effect of Expectancy Y and Valence Y on observed responses collapsing over all combinations of Expectancy X and Valence X. Levels of Expectancy Y are coded as: 1 = Unlikely; 2 = Better than even chance.

Levels of Valence Y are coded as: 1 = Most positive; 2 = Indifferent; 3 = Most negative.

These plots permit a direct analysis of the validity of the multiplicative model. A multiplicative model implies nonparallelism of the curves. The expectancy theory hypothesis of multiplication of expectancies (taking on values from 0.0 to 1.0, i.e., unipolar) and valences (taking on negative, neutral, and positive values, i.e., bipolar) implies a diverging fan of curves. The pattern of results of Figures 2 and 3 combined with the nonparallelism of all of the individual subject plots indicate the presence of some form of multiplying process. The curves form a diverging fan and are very nearly linear, as is required for a simple multiplying process. It should be noted however that the curves do exhibit a slight divergence from perfect linearity. This divergence is examined in more detail in the statistical tests that are discussed below.

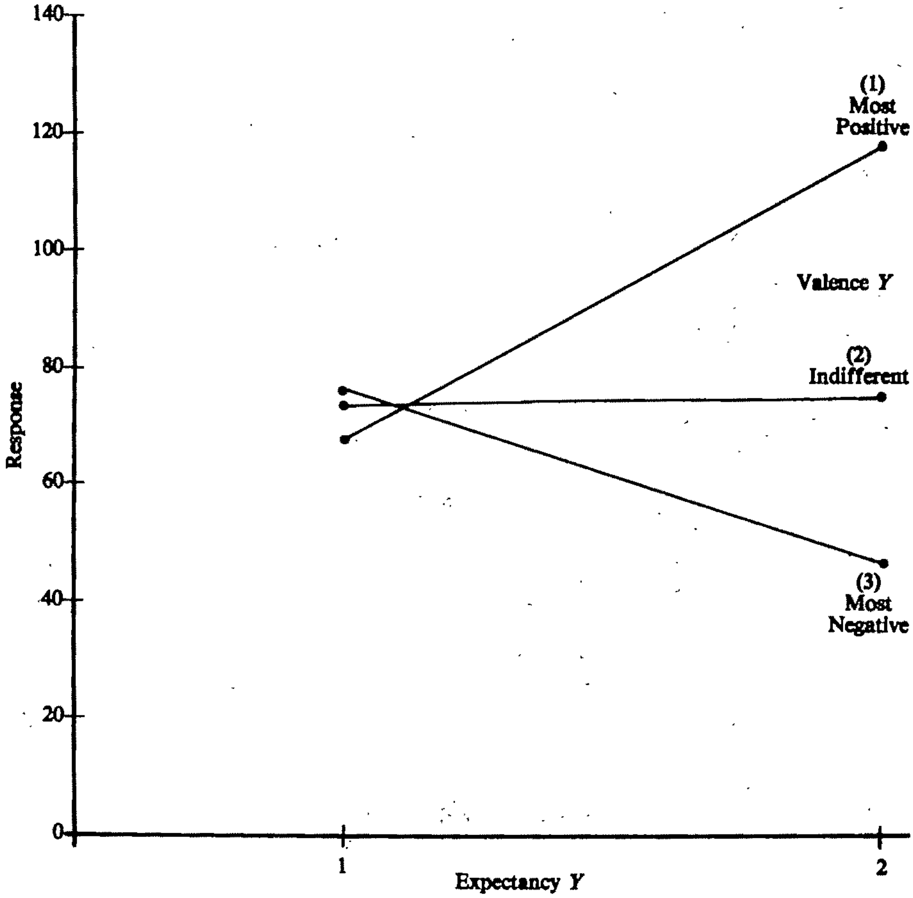
The curves do not converge at the left-most extreme corresponding to a probability of "no chance." The curves appear to converge at a point to

FIGURE 2
Mean Observed Response as a Function of Expectancy X and Valence X



the right of this value. This result probably is due to the nature of the stimulus design. Subjects were provided information regarding the probability of receiving one outcome on Job X and the probability of receiving a different outcome on Job Y. Subjects were not provided explicit information regarding the probability of receiving the Job X outcome on Job Y or the probability of receiving the Job Y outcome on Job X. (Items explicitly containing such information were employed in pretests. Subjects found the items confusing and extremely difficult to answer.) If subjects were implicitly assuming that each outcome had some non-zero probability of occurring on the alternative job, the pattern of results contained in Figure 2 would be predicted. The basic model for responses to each item is: $F_{xy} = (E_x \times V_x) - (E_y \times V_y)$. If subjects are assuming a non-zero probability of occurrence of each outcome on the alternative job the model becomes: $F_{xy} = [(E_x \times V_x) + (\gamma_y \times V_y)] - [(E_y \times V_y) + (\delta_x \times V_x)] = (E_x - \delta_x) V_x - (E_y - \gamma_y) V_y$.

FIGURE 3
Mean Observed Response as a Function of Expectancy *Y* and Valence *Y*



This issue does not bear on the conclusion that the pattern of results observed in Figures 2 and 3 requires a multiplicative model for its explanation.

Statistical Analysis

In addition to the graphical test, the design permits a direct statistical test of the validity of the multiplicative hypothesis from the analysis of variance. The critical test of the validity of the multiplicative hypothesis is the bilinear analysis. If the simple multiplying model is valid, the two-way interactions of $E_x \times V_x$ and $E_y \times V_y$ should be significant and should be concentrated in the bilinear (linear × linear) component. It also should be pointed out that main effects for expectancy and valence are predicted by and are consistent with the multiplicative hypothesis of expectancy theory.

Even if the underlying process is simple multiplication of expectancy and valence, the combination of a unipolar scale (expectancy) and a bipolar scale (valence) will always result in a main effect for valence in the analysis of variance. In addition, a main effect for expectancy will be observed to the extent that stimulus levels of valence employed in the design are not perfectly symmetrical about their true zero point.

The analysis thus proceeds in three steps for each subject: (1) analysis of variance to test the significance of the two predicted two-way interactions (Expectancy X × Valence X and Expectancy Y × Valence Y), (2) extraction of the bilinear trend of the predicted two-way interactions, and (3) testing of the significance of the residual two-way interactions after bilinear trends are extracted. If the simple multiplying model of expectancy theory is valid, then (1) the predicted two-way $E \times V$ interactions should be significant, (2) these interactions should be concentrated in the bilinear trend, and (3) the residual two-way interactions should be zero in principle and hence nonsignificant in practice.

The results of the analysis of variance for the full model in terms of variance explained are summarized in Table 3. Analyses were carried out separately for each subject and then averaged. Of the factors predicted by the multiplicative expectancy model: (1) the two predicted two-way interactions ($E_x \times V_x$ and $E_y \times V_y$) account for 46 percent of the total variance and (b) the main effects account for 37 percent of the variance. The effects predicted by the multiplicative model thus account for 83 percent of the total variation in resultant force.

The data also were analyzed in terms of the 3-step statistical analysis described above for each of the 31 subjects. All subjects pass step 1 of the

TABLE 3
Mean Variance Explained

Source	ω^2
Main effects	.366
E_x	.024
V_x	.143
E_y	.026
V_y	.173
2-way interactions	.476
$E_x \times V_x$	.245
$E_x \times E_y$	.001
$E_x \times V_y$	.004
$V_x \times E_y$	.003
$V_x \times V_y$	.011
$E_y \times V_y$	.212
3-way interactions	.026
$E_x \times V_x \times E_y$	.002
$E_x \times V_x \times V_y$	.012
$E_x \times E_y \times V_y$	.003
$V_x \times E_y \times V_y$	.009
4-way interaction	.004

test. All 62 predicted two-way interactions ($E_x \times V_x$ and $E_y \times V_y$ for each of 31 subjects) are significant ($p < .001$). The range of F values is from 16.35 to 1163.05, the mean F is 224.47, and the median is 106.95.

Step 2 of the analysis requires determination of whether these significant predicted interactions are concentrated in the bilinear trend. Of the 62 interactions, 59 have more than 50 percent of the variance concentrated in the bilinear trend. Of the 62 bilinear trends, 61 are statistically significant (F values vary from .49 to 2643.68, mean = 831.68, median = 777.93). Across all 31 subjects, the $E_x \times V_x$ interaction has a median bilinear trend accounting for 90 percent of this two-way interaction, and the median bilinear trend of the $E_y \times V_y$ interaction accounts for 95 percent of this two-way interaction. The results of step 2 thus indicate that, on average, the predicted two-way interactions are concentrated in the bilinear trend, as is required for a simple multiplying model. However, evidence for a discrepancy from simple multiplication has appeared for three subjects.

Finally, if the simple multiplying model is valid, the residual $E_x \times V_x$ and $E_y \times V_y$ two-way interactions following extraction of their bilinear trends are zero in theory and hence should be nonsignificant in practice. Step 3 of the analysis involves testing the statistical significance of these residuals. The results are not as specifically predicted by a simple multiplying model. Of the residuals, 45 are significant at the .01 level and an additional 4 are significant at the .05 level. Only 13 of the 62 residuals are nonsignificant. There are no subjects for whom both residuals are nonsignificant. The F values for the residuals range from .24 to 2244.15. The median is 7.61, and the mean is 82.61. However, it must be kept in mind that although a large number of residuals were statistically significant, the residual variance in most cases is quite small. In the case of the $E_x \times V_x$ interaction, 90 percent of the interaction sum of squares on average was in the one degree of freedom associated with the bilinear trend (the range is from 71 percent to 99 percent), and only .67 percent on a pro rata basis was associated with each of the 15 degrees of freedom in the residual. For the $E_y \times V_y$ interaction, the single degree of freedom associated with the bilinear trend accounted for 95 percent of the interaction sum of squares on average (the range is from 0 percent to 99 percent), leaving only 5 percent for the one degree of freedom in the residual.

DISCUSSION

The nonparallelism of the curves in the graphical test and the existence of significant two-way interactions of expectancy and valence concentrated in the bilinear trend in the statistical test provide strong support for the interaction of expectancy and valence in the determination of motivational force. More specifically, these data rule out the validity of simple additive models hypothesizing the addition of expectancies, valences, or both as the determinants of motivational force. However, the finding that for a small number of subjects these interactions were not concentrated in the bilinear trend, combined with the finding that for many subjects the residual two-way interactions were significant (though often small in magnitude), suggests the need for further careful research to determine whether the small (though statistically significant) departures from model predictions are indicative of a flaw in the model or are artifactual to the present study. Overall, the results are strongly supportive of a multiplicative formulation.

However, before generalizing too broadly from these results, attention must be paid to the constraints inherent in the present study. This research was carried out in the laboratory, presented subjects with explicit written information regarding the probability of attaining a single outcome on a job, and employed self-reports of levels of motivation as the dependent variable.

Whether the results obtained are more generally valid requires additional research in which:

1. Alternative measures to self-reports of level of motivation are employed as the dependent variable.
2. The expectancy and valence of more than a single outcome associated with each alternative act are varied.
3. Levels of expectancy of attaining outcomes vary as a function of less explicit environmental information regarding the likelihood of attaining outcomes relevant to the subject.
4. Field rather than laboratory research settings are employed.

The two primary (and interdependent) obstacles to such research are: (a) the rapidly increasing complexity of within-subjects designs as number of outcomes is increased and (b) adequate measures of expectancy, valence, and force. If the researcher is only satisfied that his/her measures are categorical, then analysis of variance (or, equivalently, dummy variable regression) designs must be employed. Such designs rapidly become unmanageably large, even for a small number of outcomes. As the quality of measures improves, more compact designs can be employed, even for within-subjects research. However, the gains in terms of design efficiency must be traded off against the difficulty of deriving more psychometrically sophisticated scales of the variables.

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Relationships between Recruiting Sources and Employee Performance, Absenteeism, and Work Attitudes

JAMES A. BREAUGH
University of Missouri–St. Louis

This field study sought to determine whether the sources through which employees are recruited are related to subsequent job performance, absenteeism, and work attitudes. The study found strong source-of-recruitment effects. Newspapers and college placement offices were, in general, poorer sources of employees than journal/convention advertisements and self-initiated contacts.

Although the importance of research dealing with recruiting sources (e.g., employment agencies, employee referrals) has been well recognized (Gannon, 1971; LIMRA, 1962; Malm, 1954), studies in this area have been limited in both number and scope. To date, the few studies that have been carried out have focused on recruiting sources as they relate to subsequent employee tenure with the organization. In general, this line of research (Decker & Cornelius, 1979; Gannon, 1971; Reid, 1972) has shown that employee referrals are among the best sources of long tenure employees and newspaper advertisements and employment agencies are among the worst sources.

In reviewing these sources of recruitment studies, it becomes apparent that several important research questions remain. At present, although recruiting sources have been linked to employee turnover rate, whether such sources also are systematically related to worker performance, absenteeism, and attitudes (e.g., job satisfaction) has not been documented. In addition, because of the types of samples used in the previous studies (e.g., bank tellers, insurance agents, clerical employees), some relatively common sources of recruitment (e.g., college placement offices) have not yet been examined. Clearly, additional research on sources of recruitment is needed.

Building on the work of previous researchers, for example, Decker and Cornelius (1979) and Gannon (1971), the present study was designed to examine whether the source by which an individual was recruited (college placement office, newspaper, journal/convention advertisement, self-initiated) is related to employee performance, absenteeism, and work attitudes (work satisfaction, job involvement, supervisory satisfaction). Because of the lack of research in this area, no a priori hypotheses were made.

METHOD

The sample for this study was composed of 112 research scientists (70 males and 42 females) who were doing applied research for a large midwestern organization. These individuals had degrees (bachelor's, master's, or doctorates) in either biology or chemistry. Data were gathered both directly from these employees and from their personnel files. The self-report data were gathered during working hours by means of a short questionnaire.

The source through which an employee was recruited was determined from the personnel file. This organization categorizes its recruiting sources as follows: newspaper advertisement, college placement office, professional journal/convention advertisement, self-initiated, and referred by a current employee. The original sample to be used in this study consisted of 115 scientists; however, only 3 scientists had been recruited by present employees. Given the small number in this category, no statistical analyses could be carried out. Therefore, these persons were dropped from the sample. The remaining 112 individuals were distributed among the four remaining recruiting sources as follows: newspaper ($n = 30$), college placement ($n = 24$), journal/convention advertisement ($n = 26$), and self-initiated ($n = 32$).

Absenteeism and performance data also were garnered from personnel records. Absenteeism, as reported in this study, reflects the total number of days an employee was absent in the previous 12 months. Supervisory ratings of four different performance dimensions (quality, quantity, dependability, and job knowledge) were recorded for each of the study's participants. Each of the performance ratings was made on a 5-point continuum (1 = unsatisfactory...5 = exceptional). These performance ratings were collected shortly after the self-report data were gathered as part of the individual's annual performance review.

Biographical information and work attitude data were gathered by a research questionnaire. The biographical information included: employee age, sex, years of education, years with the company, years in the current position, and years under present supervisor. Three different work attitudes were assessed. Satisfaction with work (e.g., "Generally speaking, I'm very satisfied with this job") and satisfaction with supervision (e.g., "I am satisfied with the overall quality of supervision I receive from my supervisor") were measured by instruments developed by Hackman and Oldham (1975); job involvement (e.g., "I am very much involved personally in my work") was evaluated by Lawler and Hall's (1970) measure.

The recruiting strategy utilized by this organization is as follows. Because of frequent job openings, research scientists are recruited year-round. All of the recruiting sources outlined earlier are used concurrently in attempting to fill the various job openings.

RESULTS

Before examining whether the source by which an employee was recruited is related to performance, absenteeism, or work attitudes, it is important to determine whether the four sources of recruitment groups differed on demographic variables. Univariate analysis of variance was used to test for the existence of such group differences. No statistically significant ($p<.05$) differences were found for employee age ($F_{3,108}=.84$), sex ($F_{3,108}=1.02$), years of education ($F_{3,108}=2.40$), years with company ($F_{3,108}=2.31$), years in present position ($F_{3,108}=1.25$), or years under present supervisor ($F_{3,108}=1.06$). Overall, the employees averaged 36.4 years of age, 17.7 years of education, 8.4 years with the company, 5.7 years in present position, and 3.5 years under their present supervisor.

The intercorrelations of the dependent variables examined in this study are reported in Table 1. As can be seen, the four performance ratings are somewhat intercorrelated. The three work attitude measures are also somewhat interrelated. Because of the intercorrelations just discussed, multivariate analysis of variance was used to examine the effects of source of recruitment on the performance and work attitude variables. Due to its general lack of association with the other dependent variables, employee absenteeism differences were tested by univariate analysis of variance.

Highly significant ($p<.01$) multivariate effects were found for both employee performance ($F_{8,212}=5.29$) and worker attitudes ($F_{6,214}=3.46$). Univariate F ratios were computed to assess the individual significance of the performance and work attitude measures as well as to test for a source of

TABLE 1

Intercorrelations of Dependent Variables[a]

($N=112$)

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Quality	—							
2. Quantity	.20	—						
3. Dependability	.63	.24	—					
4. Job knowledge	.55	.19	.55	—				
5. Absenteeism	−.16	.11	−.09	−.15	—			
6. Work satisfaction	.41	−.01	.18	.15	−.09	(.84)		
7. Job involvement	.28	−.18	.12	.00	−.13	.36	(.82)	
8. Supervisory satisfaction	.10	−.11	−.02	.06	−.20	.51	.14	(.87)

[a] Diagonal entrees are coefficient alpha reliability estimates for multi-item self-report variables.

TABLE 2

Source of Recruitment Differences: Group Means and Summary of the Analysis of Variance

Variables	*Convention/ Journal Ad*	*Newspaper*	*College Placement*	*Self-Initiated*	*F*	*Percent of Variance*
Quality	4.15_a	3.86_a	3.33_b	3.94_a	7.07**	16
Quantity	3.69	3.60	3.58	3.56	.15	—
Dependability	4.15_a	3.73_b	3.67_b	4.13_a	3.84**	10
Job knowledge	4.23	4.13	4.00	4.01	.54	—
Absenteeism	1.61_a	7.47_b	3.50_a	3.75_a	10.86**	23
Work satisfaction	5.33	5.26	4.75	5.23	.86	—
Job involvement	3.62_a	3.71_a	2.63_b	3.44_a	3.92**	11
Supervisory satisfaction	5.51_a	5.51_a	4.67_b	5.46_a	3.31*	9

Note: Means that do not share the same subscript are significantly different at the .05 level by Duncan's Multiple Range Test. Larger means reflect higher levels of the variables.

*$p < .05$

**$p < .01$

recruitment effect for absenteeism. The results of these analyses are reported in Table 2 along with the raw cell means for each of the variables. As is apparent, several strong recruitment effects were detected.

DISCUSSION

Review and Interpretation of Findings

From the data presented, it is clear that for this sample the source through which an employee was recruited is strongly related to subsequent job performance, absenteeism, and work attitudes.

With regard to employee performance, the results of the multivariate and univariate analysis of variance show strong source-of-recruitment differences. Individuals recruited through college placement offices and, to a lesser extent, those recruited via the newspaper were inferior in performance (i.e., quality and dependability) to individuals who made contact based on their own initiative or a professional journal/convention advertisement. In terms of absenteeism, another strong source of recruitment effect was demonstrated. Those recruited through newspaper ads missed almost twice as many days as did those referred by any of the other sources. The results of analyses on work attitudes also documented recruiting source differences. College placement office recruits reported significantly lower levels of job involvement and satisfaction with supervision than did employees recruited in other ways. Taken as a whole, these results demonstrate that college placement offices and newspaper advertisements were poorer sources of employees than were journal/convention advertisements and self-initiated contacts.

Concluding Remarks

This study expanded the scope of previous source of recruitment studies (Decker & Cornelius, 1979; Gannon, 1971) by including measures of performance, absenteeism, and work attitudes. In addition, a common source of recruitment, the college placement office, that previously had not been empirically examined was investigated. As with the results of any study based on one sample drawn from a single organization, caution needs to be exercised in generalizing the results of this study. However, as this and other studies have demonstrated, the sources through which employees are recruited can have powerful effects. Recruiting source differences in turnover rate have been found for a variety of samples (e.g., bank tellers, clerical employees, insurance agents, trade workers); and in the present study, employee performance, absenteeism, and work attitudes were shown to be related to source of recruitment. Based on the findings of these studies, it appears that organizations may benefit greatly from systematically examining the recruiting sources that they are currently utilizing.

The need for additional research dealing with recruiting sources should be emphasized. Although the current study and previous ones have documented important recruitment source differences (e.g., performance, turnover), the reason for these differences is not entirely clear. Research more theoretical in nature is required to understand the cause of source differences.

A conceptual framework, which appears to offer promise for explaining recruiting source differences, has recently been put forth by Wanous (1978). Wanous posits that individuals who possess more accurate and more complete information about a job will be both more productive and more satisfied than will individuals who have less accurate and less complete information. Although Wanous's (1978) model is complex, a simplification of the logic that underlies it follows. With regard to performance, Wanous argues that individuals who have more complete and accurate information will have a clearer view of what the job entails (role clarity) and thus will be more likely to perform the job well than will individuals lacking such information. Concerning satisfaction, Wanous suggests that individuals possessing more complete information will not be likely to consider jobs that do not match their needs. Thus those individuals who chose to join the organization will be more satisfied with their jobs than will individuals who possessed less complete and less accurate information.

Obviously, Wanous's (1978) model helps explain source differences only if one can show that some recruiting sources do, in fact, provide more information than do others about what a job entails. Fortunately, a number of writers (Azevedo, 1974; Decker & Cornelius, 1979; Hawk, 1967) have addressed this issue. For the most part, these authors concur on the relative accuracy and completeness of the information provided by various recruiting sources. In general, these researchers agree that individuals applying directly to organizations (self-initiated) or who are recruited at professional conventions possess more accurate and more complete information about the work situation than do individuals recruited via newspapers or college placement offices. The logic explaining such informational differences is quite complex and beyond the scope of this paper. However, one can see that by combining the work of Azevedo (1974), Decker and Cornelius (1979), and Hawk (1967) with Wanous's (1978) model, the findings reported in this paper are readily understandable. In this study it was found that individuals recruited by means that have been suggested (Azevedo, 1974; Decker & Cornelius, 1979) to provide less accurate and less complete information (i.e., newspapers and college placement offices) did not work out as well (e.g., performance) as did individuals recruited via sources that have been suggested to provide more accurate and more complete information (i.e., convention/journal ad and self-initiated).

In sum, it appears that Wanous (1978) has provided a conceptual framework that may help explain source-of-recruitment differences. However, other explanations for source differences also exist (e.g., individuals may be treated differently depending upon how they were recruited). Clearly, theoretically based research, which systematically assesses the information provided by various recruitment sources, is needed.

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Predicting Voluntary and Involuntary Turnover Using Absenteeism and Performance Indices

STEPHEN A. STUMPF
PATRICIA KELLY DAWLEY
New York University

Absenteeism and performance indices accounted for substantial variance in bank teller voluntary turnover (resignation) and involuntary turnover (dismissal). Predictor and criteria relationships changed substantially for individuals newly employed in 1977-78 compared to 1970-76; however, reasonable cross-validation was exhibited. The results suggest a need to include more criterion variables in theoretical models.

Recent reviews of the withdrawal behavior literature have identified only a few studies that consider individual performance a predictor of turnover, performance as a predictor of absenteeism, or absenteeism as a predictor of turnover (Mobley, Griffeth, Hand, & Meglino, 1979; Porter & Steers, 1973; Price, 1977). No studies were identified that addressed changes in the relationships among these variables over time despite Porter and Steers' (1973) call for more research seven years ago. This lack of attention may be perpetuated if research is guided by theoretic models of the withdrawal process that do not specify relationships among these variables (Mobley et al., 1979; Steers & Porter, 1979; Steers & Rhodes, 1978). Staw and Oldham (1978) suggest that the failure to consider dependent variables in greater detail could lead to inappropriate research generalizations and misguided solutions to personnel problems.

Studies investigating the relationships between two or more of these criteria have yielded inconsistent results. Performance has been found to relate to turnover positively (Marsh & Mannari, 1977), negatively (Argyle, Gardner, & Cioffi, 1958; Turner, 1960), and not at all (Sheridan & Vredenburgh, 1978). The relationship between performance and absenteeism has been equally ambiguous (Argyle et al., 1958; Ronan, 1963; Seashore, Indik, & Georgopoulos, 1960; Staw & Oldham, 1978; Turner, 1960).

Although absenteeism and turnover tend to correlate positively, the predictors of absenteeism and turnover within a study are often different (Lyons, 1972; Steers & Rhodes, 1978).

The paucity of research on performance-withdrawal relationships could be due to several factors: (1) Reliable and valid criterion measures are difficult to obtain. Single criterion studies are still common in the literature. (2) Attention has been on the relationship of job satisfaction or job facet satisfaction with performance or withdrawal behavior *separately*. Research and theory addressing one area generally has not included the other. Thus, the performance-withdrawal relationships have escaped scrutiny. (3) Turnover research has focused primarily on voluntary turnover although it has been measured in ways that include involuntary turnover as well (Muchinsky, 1978). Performance would be expected to predict involuntary turnover but not necessarily voluntary turnover. Wanous, Stumpf, and Bedrosian (1979) found a significant correlation of –.38 between a supervisor's appraisal of performance and involuntary turnover and a significant correlation of –.34 of performance with voluntary turnover. Their study involved more than 1,700 workers employed in several hundred small businesses. Given that most single predictors of turnover have accounted for less than 15 percent of turnover variance, the performance-withdrawal relationships should be pursued.

The purposes of the present research are: (1) to analyze the relationships among absenteeism, performance, and voluntary and involuntary turnover in conjunction with several personal characteristics and (2) to investigate changes in the relationships among these variables for two groups each in a different time period. An understanding of the relationships among these variables is necessary in order to design more effective personnel policies and practices. If improving attendance or performance were at the expense of increased voluntary turnover, then the costs of increased turnover would have to be considered in evaluating the changed personnel practices. Alternatively, if the level of attendance affected the performance-withdrawal relationship, then such contingencies should be incorporated into future research and practice.

METHOD

Sample

Full-time bank tellers employed by a mutual savings bank located in a large metropolitan area were the subjects of this research. Tellers often are considered a subgroup of general office workers because the hiring practices and job related skills of tellers and office workers are similar (Lynton, Seldin, & Gruhin, 1978). Although the present study involves only one organization, the employment and personnel practices for tellers are fairly standardized for the banking industry (Lynton et al., 1978). Full-time tellers employed from 1970 through 1976 ($N = 354$) constituted the

1970-1976 group. The results obtained using these data were used to predict the behavior of an independent group of new tellers employed in 1977 and 1978 ($N=242$). Results are reported for the 1970-1976 group unless noted.

Organizational Changes

Between 1975 and 1978 the bank increased its number of branches from 12 to 20. Savings bank services were offered in several middle-class suburban communities. New tellers generally were members of the local communities; few branch transfers were made. Only one major hiring practice was changed throughout the nine year period: a mathematical abilities test was eliminated as a selection device in mid-1977. However, 90 tellers who were hired in 1977 and who had completed the test scored significantly higher than did those hired in the 1970-1976 period ($p \leq .01$). The 1977-1978 tellers had also scored significantly higher on a clerical abilities test, were more educated, less likely to be married, and more likely to be nonwhite ($p \leq .01$). There were *no* significant differences between the two populations in terms of sex, age, or number of dependent children. The increases in selection test scores and different demographics were attributed to changes in the job applicant pool as a result of operating more suburban branches.

Management indicated that the 1977-1978 tellers seemed to be of higher quality based on absenteeism and performance indices. Several personnel practices had been changed over the nine years in an effort to reduce absenteeism and improve performance. New tellers were given more extensive job training and/or remedial training when clerical or numerical skills were poor; supervisors were trained in counseling new tellers, providing tellers with regular feedback on attendance and difference records, and in overall performance evaluation. Attempts were made to identify problem tellers early in their training and thereby reduce future problems. The changes in personnel practices generally were implemented over several years.

Independent Variables

Eight independent variables separately were used to predict voluntary and involuntary turnover: four personal characteristics (sex, age, education, and tenure), absenteeism, and three indices of performance (difference record, promotional increases, overall performance ratings). Absenteeism, difference record, and performance ratings were first calculated on an annual basis, then an overall rating was made for the period of employment for each teller.

Personal Characteristics—Personal characteristics were treated as antecedents of performance and withdrawal behaviors. In order to investigate the relationship of performance with withdrawal without the influence of personal characteristics present, it was necessary to hold constant salient personal characteristics. Reviews of turnover research by Mobley et al. (1979), Porter and Steers (1973), and Price (1977) indicate that sex, age, educational level, and tenure often account for significant variance in withdrawal behavior.

Sex has frequently been a correlate of turnover; however, males withdraw more often in some studies, females in others. The sex linkage with withdrawal appears to be contingent on several variables such as the type of job and the labor market. In the present study males (coded 1) were predicted to have higher voluntary turnover than females (coded 2) because of the sex-role stereotype and low pay associated with the teller's position. No prediction was made for the relationship between sex and involuntary turnover.

Age and tenure have demonstrated fairly consistent negative relationships with turnover. As one gets older and is in an organization longer, one is less likely to leave voluntarily. Involuntary turnover also is likely to be less a function of tenure because poor performers would have been asked to leave before much tenure was accrued.

Price (1977) found education to have a weak positive relationship with turnover in his review; Mobley et al. (1979) found mixed results. Because the teller position requires no formal education beyond high school (Lynton et al., 1978), education was expected to relate positively to voluntary turnover. No relationship was predicted for involuntary turnover. Education was categorized by the level completed at initial employment as follows: (1) less than high school graduate ($n = 4$), (2) high school graduate or equivalency certificate ($n = 264$), (3) some formal education beyond high school ($n = 79$), and (4) four year college degree ($n = 7$).

Absenteeism—Based on management's view of the bank's current personnel practices, absenteeism was expected to relate negatively with performance measures and positively with voluntary and involuntary turnover. Absenteeism records were compared annually with other state mutual savings banks to ensure reasonable norms. Over 90 banks regularly participate in the survey of banking personnel practices; an average absenteeism rate of six days per year has been the industry mean. Excused absences such as immediate family funeral attendance, jury or military duty, maternity leave, or illness covered by workers compensation are not included.

Two factors were included in an absenteeism index: total days absent and pattern of absences. A 3-point index was developed in which the midpoint (coded 2) reflected those who generally had been absent between five and seven days per year. Absences of several days duration were not rated as severely as seven single days absent; hence, some rater judgment was required. Individuals with less absenteeism than average were coded 1; those with more absenteeism than average were coded 3. To facilitate the summarization of many ratings over the nine years of this study, two raters reviewed the data in the personnel files and made independent absenteeism ratings for the entire tenure period of the employees. Interrater reliability was .98; the six differences were resolved by the two raters by discussing the data involved.

Performance—Three indices of performance were used to reflect the varying types of appraisal information tellers regularly receive: difference records, promotional increases, and overall performance ratings.

The difference record is based on a teller's closing tally; differences of over $1 in cash shortage or overage are recorded daily and summarized monthly. Not only is the difference record an index of the quality of work, but government regulations require daily balancing of all transactions. Differences are a cost to the bank in direct dollar amount plus the administrative effort required to determine where and why the difference occurred. The difference record provides a teller with daily, objective feedback on an aspect of performance for which the teller has complete control. As such, it provides task feedback as defined by Hackman and Oldham (1975). To the extent that this feedback was positive, voluntary and involuntary turnover were predicted to be lower (Ekpo-Vfot, 1976; Martin, 1979).

All difference records indicating both frequency and amount were reviewed by the bank annually to ensure reasonable standards. A difference record considered average (coded 2) had a range of 9 to 25 differences (over $1 cash overage or shortage and not more than one difference over $100). An above average difference record (coded 3) had below 9 differences and no single difference above $100 (differences are negative aspects of performance); below average differences were coded 1. Two raters independently made difference record evaluations for the entire tenure of the employee; interrater reliability was .98. Rater differences occurred only for individuals who had incomplete or unusual difference records; they were resolved by discussion.

Promotional increases for tellers in their first two years were well defined in terms of timing and percentage salary increase (Lynton et al., 1978). Individuals generally started as teller trainees even if they had previous teller experience at another bank because of differences in electronic equipment and bookkeeping procedures. After 3 to 4 months, average and above average tellers were promoted to junior tellers, and on to intermediate tellers after 9 to 12 months service. The promotion to senior teller one or more years later required one to be able to perform all aspects of the job with little or no supervision.

During the initial period of employment, promotional increases provide direct feedback on teller assimilation of training. Early promotional increases also serve to notify tellers of management's view of their future potential. Promotional increases were indexed in the number of such increases per year and were expected to relate negatively to voluntary and involuntary turnover (Porter & Steers, 1973).

An overall performance rating was made annually based on written teller performance evaluations made after 1, 3, and 12 months of employment and annually thereafter. The overall ratings were made with knowledge of teller absenteeism, difference records, and past promotional increases, as well as additional evaluative information. Standard appraisal information provided by supervisors on tellers included: (1) the quantity of work, (2) the quality of performance including accuracy, thoroughness, and effectiveness, and (3) evaluations of customer contact skills, communication skills, co-worker relations, and the tellers' attitudes towards the job. The overall performance ratings were a composite measure designed to include both objective and subjective elements of performance. As such, they were expected to relate negatively with involuntary turnover.

Performance was rated as average (coded 2), below average (coded 1), or above average (coded 3). Average ratings could include some factors rated high and others low as long as overall performance was judged satisfactory. Supervisors attended at least one training session per year conducted by the personnel department for the purpose of establishing and maintaining performance norms and improving the consistency and judgmental accuracy of the supervisors. All performance reviews were summarized by the bank annually to facilitate comparison of tellers in different branches. Because ratings were made by many supervisors over several years, a global index of overall performance was established for the entire tenure of the employee for this research. The interrater reliability among the two raters making independent overall performance evaluations was .96. Rater differences were resolved. (Validity information on the performance appraisal *instrument* was not available. The instrument had been in use for over 10 years and focused on specific job behaviors—for example, difference records, attendance, interpersonal skills with customers. The data presented in Table 1 for 1970-1976 suggest reasonable validity. The performance rating is not strongly related to sex, age, or education, but is related to other more objective performance indices. An overall performance rating was used in this research to facilitate comparison of performances indices with other studies and because the organization used the overall rating in its decision making.)

Dependent Variables

Turnover data were categorized as still on the job (coded 0), voluntary turnover (coded 1), and involuntary turnover (coded 2). Individuals still employed on December 31, 1976 ($n=93$) and those hired in 1977-1978 and still employed on December 31, 1978 ($n=97$) constituted the still employed groups. Employees who began employment as a teller but who subsequently were transferred to another department in the bank were excluded ($n=34$). Voluntary turnover included tellers resigning for reasons other than pregnancy, retirement, or family relocation ($n=96$, 1970-1976;

$n=91$, 1977-1978). The most common reason for resignation was to accept another position. Involuntary turnover included tellers dismissed for cause, including theft, unacceptable performance, insubordination, and inability to learn aspects of the job ($n=165$, 1970-1976; $n=54$, 1977-1978). Total turnover for each period approximated the industry average of 40 percent per year (Lynton et al., 1978). Involuntary turnover accounted for two-thirds of the turnover in 1970-1976, which was believed by management to be higher than the industry average; only one-third of the turnover in 1977-1978 was involuntary, which was believed to be below the industry average.

Analysis

Separate correlational analyses were conducted for voluntary and involuntary turnover for the 1970-1976 and 1977-1978 groups. Individuals still employed were used in the voluntary and involuntary turnover analysis. This strategy has been employed in other research (Wanous et al., 1979) and facilitates comparison of this study with studies investigating only voluntary turnover.

Separate regression analyses also were conducted for both forms of turnover. The regression equations developed using the 1970-1976 group were used subsequently to predict 1977-1978 teller behavior.

In order to investigate retention, voluntary turnover, and involuntary turnover as mutually exclusive categories of behavior, a multiple discriminant analysis (MDA) was conducted. The classification function coefficients from the MDA were used to classify tellers in the 1970-1976 and 1977-1978 groups.

RESULTS

Personal Characteristics

The means, standard deviations, and correlations among the independent and dependent variables are shown in Table 1. Female tellers were somewhat older ($r=.20$), less educated ($r=-.26$), and withdrew less often ($r=-.16, -.18$) than their male co-workers. Age was weakly related to each performance measure and negatively related to both voluntary turnover ($r=-.26$) and involuntary turnover ($r=-.21$). In 1970-1976 tenure demonstrated relationships to other variables in a pattern paralleling age; however, the correlations were uniformly larger. The substantial restriction in the amount of tenure a person could accrue between 1977-1978 may explain the low relationship of tenure with performance and withdrawal behaviors for the 1977-1978 group. In contrast, education was unrelated to absenteeism, performance, and turnover for both groups.

TABLE 1
Means, Standard Deviations, and Correlations for the 1970-1976 Group and 1977-1978 Group (in parentheses)[a]

	Mean	SD	Correlations							
			1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Personal characteristics										
Sex (1)	1.79 (1.83)	.41 (.37)	—							
Age (2)	25.92 (25.10)	9.68 (8.55)	.20** (.13*)	—						
Education (3)	2.26 (2.43)	.49 (.65)	-.26** (-.22**)	.09 (.00)	—					
Tenure (4)	2.29 (1.45)	2.98 (1.70)	.12* (.01)	.32** (-.05)	-.16** (-.08)	—				
Absenteeism (5)	1.91 (1.43)	.60 (.73)	.00 (-.08)	-.07 (-.13*)	.00 (-.12)	-.16** (.07)	—			
Performance										
Difference record (6)	2.00 (2.58)	.62 (.57)	.06 (.08)	.18** (.05)	-.10 (.00)	.27** (-.11)	-.40** (-.30**)	—		
Promotional increases (7)	.20 (1.69)	.50 (1.40)	.06 (.04)	.16** (.13*)	-.04 (.17**)	.44** (-.03)	-.16** (.05)	.28** (-.07)	—	
Performance rating (8)	2.00 (2.12)	.56 (.69)	.06 (.08)	.14** (.13*)	-.01 (.07)	.31** (.17**)	-.42** (.11)	.50** (.15*)	.30** (.46**)	—
Dependent variables										
Voluntary turnover (9)	.51 (.48)	.50 (.50)	-.16* (-.13)	-.26** (-.11)	.09 (-.14)	-.35** (.25**)	.23** (.15*)	-.41** (-.12)	-.33** (-.81**)	-.30** (-.21**)
Involuntary turnover (10)	1.28 (.72)	.96 (.96)	-.18** (-.03)	-.21** (-.18*)	.01 (-.15)	-.32** (.16)	.38** (.01)	-.50** (-.04)	-.39** (-.84**)	-.36** (-.66**)

[a] $N = 354$ for the validation group; $N = 189$ for voluntary turnover and 258 for involuntary turnover. Age and tenure were measured in years. $N = 242$ for the 1977-1978 group (in parentheses); $N = 188$ for voluntary turnover and 151 for involuntary turnover.

* $p \leq .05$

** $p \leq .01$

Relationships Among Criteria

Absenteeism correlated substantially and significantly with difference record ($r = -.40$), performance ratings ($r = -.42$), and involuntary turnover ($r = .38$); it correlated moderately with voluntary turnover ($r = .23$). The latter two correlations are significantly different from each other at the $p \leq .10$ level. The significance test used to compare these correlations is conservative because the correlations are not independent; the voluntary and involuntary turnover groups share individuals still employed.

The relationship of absenteeism to other variables changed significantly for the 1977-1978 group (Table 1). The absenteeism rating decreased from 1.9 to 1.4 ($p \leq .01$). The correlation of absenteeism with difference record decreased to a still significant -.30. The relationship of absenteeism significantly decreased ($p \leq .01$) and reversed direction with both promotional increases ($r = .05$) and performance rating ($r = .11$). Absenteeism was no longer a predictor of involuntary turnover ($r = .01$) and only a weak predictor of voluntary turnover ($r = .15$, $p \leq .05$).

The three performance indices intercorrelated significantly, with the difference record accounting for the most variance in the overall performance rating in 1970-1976 ($r = .50$). For the 1977-1978 group promotional increases correlated highest with the overall performance rating ($r = .46$); difference record was only weakly related to the performance rating ($r = .15$). The average difference record improved from 2.0 in the 1970-1976 period to 2.6 in 1977-1978 ($p \leq .01$). As difference records improved, they became a less important factor in overall performance ratings.

Each performance measure correlated negatively and significantly with voluntary and involuntary turnover, although more strongly with involuntary turnover. The strongest performance predictor of turnover was the difference record, which provided the most objective and immediate feedback to tellers, followed by the promotional increases index and performance ratings. The promotional increases index was the strongest predictor in 1977-1978 of both voluntary turnover ($r = -.81$) and involuntary turnover ($r = -.84$). Performance ratings were the next best predictor (r's $= -.21$ and $-.66$, respectively).

Predicting Turnover

Hierarchical multiple regression analysis was used to identify the incremental contribution of the independent variables to voluntary and involuntary turnover separately (Cohen & Cohen, 1975). The hierarchy was established based on *temporal* priority. Variables that occurred later in time were presumed not to be causes of variables that were determined earlier in time. The order that the variables entered the analyses is that shown in Tables 1 and 2. Personal characteristics were entered first, then absenteeism, and finally the performance indices. Among the performance indices, difference records were entered first because the index is immediate and objective, followed by promotional increases (less immediate and less objective), and overall performance ratings (least immediate and least objective).

Table 1 indicates substantial intercorrelation among some predictor variables that would tend to make the regression analysis beta weights less stable. The use of hierarchical multiple regression and the results of the cross-validation suggest that multicollinearity was not a problem (Cohen & Cohen, 1975).

TABLE 2

Predictors of Voluntary and Involuntary Turnover[a]

	Voluntary Turnover		*Involuntary Turnover*	
	Cum R	*R^2 Change (Percent)*	*Cum R*	*R^2 Change (Percent)*
Sex	.16**	2.6*	.18**	3.3**
Age	.28**	5.1**	.25**	3.1**
Education	.28**	0.0	.25**	0.1
Tenure	.39**	7.3**	.37**	7.0**
Absenteeism	.42**	3.0*	.49**	10.5**
Difference record	.50**	7.2**	.59**	10.4**
Promotional increases	.52**	1.9*	.61**	3.4**
Performance rating	.52**	0.1	.61**	0.0
Cumulative R^2 (percent)		27.2		37.8

[a] *N* voluntary = 189, *N* involuntary = 258. Cum *R* is the cumulative multiple correlation for all variables entered up to that point.

* $p \leq .05$

** $p \leq .01$

Personal characteristics exhibit similar incremental effects for both voluntary and involuntary turnover. Sex and age each account for significant unique variance, with the age effect somewhat stronger for voluntary turnover (5.1 percent) than for involuntary turnover (3.1 percent). Education did not add new information about withdrawal behavior. However, tenure contributed over 7 percent explained variance for both forms of turnover beyond sex and age.

Absenteeism accounted for a large, significant incremental proportion of variance in involuntary turnover (10.5 percent), but it made a moderate and significantly smaller ($p \leq .05$) contribution to predicting voluntary turnover (3.0 percent). In contrast, the difference record made a significant and substantial additional contribution for both voluntary and involuntary turnover, as did to a lesser extent promotional increases. Performance ratings were unable to account for unique voluntary or involuntary turnover variance beyond the other seven variables.

Nearly 38 percent of involuntary turnover variance was accounted for by the eight variable set (shrunken $R^2 = .36$) versus 27.2 percent for voluntary turnover (shrunken $R^2 = .24$). In cross-validation, the unstandardized regression weights from the 1970-1976 analysis efficiently predicted both voluntary turnover ($R^2 = .44$) and involuntary turnover ($R^2 = .55$). Optimal weighting of the independent variables for 1977-1978 accounted for 71 percent and 79 percent of the variance in voluntary and involuntary turnover, respectively. These squared multiple correlations compared favorably to other multivariate studies that often accounted for similar or less variance with more variables, many of which were attitudinal such as job satisfaction and intention to quit (Margione, 1973; Marsh & Mannari, 1977; Mobley, Horner, & Hollingsworth, 1978; Newman, 1974; Waters, Roach, & Waters, 1976).

Distinguishing Voluntary/Involuntary Turnover

Mean differences among those still employed, voluntary turnover, and involuntary turnover were identified using multiple discriminant analysis. All variables were able to discriminate significantly among the three groups ($p \leq .01$). However, performance rating failed to make a unique contribution beyond the other seven variables and was therefore deleted from further analysis. Table 3 presents the discriminant function centroids and coefficients for 1970-1976.

TABLE 3

Canonical Discriminant Function Centroids and Coefficients

	Function 1	*Function 2*
Groups[a]		
Still on job (Coded 1)	−1.14	.06
Voluntary turnover (Coded 2)	.18	−.28
Involuntary turnover (Coded 3)	.54	.13
Variables[b]		
Sex	−.25	−.23
Age	−.10	.34
Education	−.15	−.43
Tenure	−.24	.48
Absenteeism	.30	.52
Difference record	−.58	−.18
Promotional increases	−.39	.16
Canonical correlations	.57**	.17*

[a] Canonical discriminant functions evaluated at group means, i.e., function centroids.

[b] Standardized canonical discriminant function coefficients.

*$p \leq .05$

**$p \leq .01$

The first function identified in Table 3 discriminates the group still employed from both turnover groups, of which the greater discriminant ability is for involuntary turnover. Mean differences were most salient for sex, absenteeism, difference record, and promotional increases. Turnover was greatest for males, those with poor attendance, poor difference records, and few promotional increases. The canonical correlation was large and significant (.57).

The second function was weaker (canonical correlation $=.17$, $p \leq .05$) and predominantly compares the two turnover groups. The variables that discriminate between voluntary and involuntary turnover were sex, age, education, tenure, and absenteeism. Tellers who were female, younger, had more education, less tenure, and less absenteeism were more likely to withdraw voluntarily than involuntarily.

On application of these discriminant functions to the 1970-1976 data, 58 percent of the tellers were classified correctly as being still on the job or having voluntarily or involuntarily left. When these discriminant functions were applied to the 1977-1978 group, 44 percent were classified correctly. The optimal discriminant functions for the 1977-1978 group predicted the turnover behavior of 70 percent of the subjects correctly.

DISCUSSION

Several personal characteristics, absenteeism, and performance indices were significantly related to voluntary and/or involuntary turnover. Sex, age, and tenure each accounted for a small proportion of the 1970-1976 turnover variance summing to approximately 14 percent for both forms of turnover. Although personal characteristics did account for meaningful variance, their contribution generally was smaller than the incremental effects of absenteeism or performance indices, even when personal characteristics variance in the latter indices was statistically removed.

In interpreting the results of the present study several limitations must be kept in mind. Only one organization and job type were studied. Although many firms have personnel practices similar to those of the present organization and office workers performing tasks similar to those of tellers, the results should be generalized with caution. However, the argument that the relationships among multiple criteria should be considered over time seems equally applicable to other occupations and organizations (Staw & Oldham, 1978).

A second caution relates to the correlational nature of the study. A temporal hierarchy permits the allocation of criterion variance to predictors in a predetermined order, but it could be argued that other hierarchies are feasible. If the performance indices were considered in a different hierarchy, the unique contribution of each in predicting turnover would change.

Finally, the 1970-1976 group was significantly different from the 1977-1978 group in terms of selection test scores and some demographic variables. The organization also had increased its number of branches and altered some of its personnel practices. Such changes are a natural part of most organizations, but they potentially can confound the results of studies such as this. Hence, the findings are more appropriately viewed as descriptive of this organization rather than predictive of relationships in other organizations.

The Changing Role of Absenteeism

Absenteeism accounted for a unique 10.5 percent of involuntary turnover variance compared to only 3 percent for voluntary turnover for the 1970-1976 group; virtually no unique variance was accounted for by absenteeism in 1977-1978. The stronger relationship of absenteeism with involuntary turnover in 1970-1976 suggests that the organization may have acted before the individual chose to resign. This relationship was salient only when absenteeism was an employer problem. As attendance improved in 1977-1978, absenteeism no longer predicted involuntary turnover. The weaker although still significant absenteeism relationship with voluntary turnover may be indicative of teller dissatisfaction.

The relationship of absenteeism with the three performance indices was substantially different for the two time periods. These correlations were significantly different from each other for the more subjective promotional increases index and overall performance rating. The low positive correlation of absenteeism with the overall performance rating suggests that once a minimum level of attendance is maintained, additional attendance is not necessarily beneficial to rated performance. This is consistent with Staw and Oldham's (1978) finding that attendance can be a positive feature for some employees and jobs. The 1977-1978 group had a higher level of education, tested higher on the selection tests, and had higher difference ratings; they may have been managing their absences to benefit their psychological well-being.

Although the direction of the absenteeism-promotional increases and absenteeism-performance rating relationships changed, absenteeism continued to relate moderately and negatively with difference record ($r = -.30$, $p \leq .01$). For the 32 tellers who had high absenteeism in 1977-1978, the difference rating correlated strongly with voluntary withdrawal ($r = -.52$, $p \leq .01$); whereas a trivial relationship was demonstrated for those with low absenteeism ($n = 132$, $r = -.02$, ns). The interaction of absenteeism and performance to predict voluntary turnover suggests that individuals may sense the poor job-person match and act to eliminate the mismatch before being dismissed.

Performance/Turnover

The performance indices were significantly related to voluntary *and* involuntary turnover. The substantial intercorrelation among the indices resulted in only the difference record and promotional increase making unique contributions to predicting turnover variance. The salience of the difference record decreased in cross-validation, and promotional increases increased in importance ($p \leq .01$).

In the 1970-1976 period a below average difference record indicated a need for additional training. If no improvement was made over a few months period, the teller would be dismissed. As it became apparent to new tellers that this was bank policy, those with poor difference records may have resigned before their situation resulted in dismissal.

In 1977-1978 promotional increases were nearly synonymous with remaining on the job. Absenteeism and difference record problems had been substantially overcome, and they receded as primary criteria for promotional increases and performance ratings, or as predictors of turnover. More subjective elements of performance such as customer contact skills and co-worker relations are likely to have increased in importance. These supervisor perceptions presumably were translated into promotional increases and overall performance ratings, which subsequently affected turnover. A significantly smaller proportion of tellers were dismissed in 1977-1978 versus 1970-1976 (.22 vs. .47, $p \leq .01$), and a significantly larger proportion voluntarily withdrew (.40 vs. .26, $p \leq .05$) or remained on the job (.38 vs. .27, $p \leq .05$). Hence, the personnel issues confronting the organization had changed from dealing with absenteeism and low performance, which necessitated dismissal, to reducing costly voluntary turnover of generally acceptable employees.

Although the turnover process changed as indexed by the changed relationships among the predictor and criterion variables, the set of predictors identified for the 1970-1976 period exhibited moderate cross-validation in 1977-1978 for both voluntary and involuntary turnover. When considering the three categories of withdrawal behavior, 44 percent of the 1977-1978 teller turnover could be predicted correctly based on the 1970-1976 MDA model of turnover. Although this is significantly less than the predictive power of the 1977-1978 MDA model, it is significantly better than chance.

Implications

The absenteeism, performance, and turnover relationships over the two periods analyzed support Staw and Oldham's (1978) call for more intense investigation of criterion variables. These results suggest implications for management, model building, and applied research.

As the utility of absenteeism and difference record information decreased for the organization, the relationships among criterion variables changed. Had management been insensitive to the change, personnel practices could have quickly become outdated if not dysfunctional. For example, absenteeism and voluntary turnover are generally viewed as personnel problems. Yet, for some employees moderate absenteeism related positively to performance; for other employees voluntary withdrawal preceded dismissal for poor performance. Policies to reduce absenteeism for the former employees or policies to increase benefits to reduce voluntary turnover in general would be questionable and costly practices.

Models of human performance and withdrawal behavior should begin to include multiple criteria—a minimum of which would be absenteeism, performance, voluntary and involuntary turnover. Contingency relationships among predictors of these criteria and among these criteria then could be systematically specified. As research is done in many organizations over time, a general model may evolve that incorporates the mean differences in predictors and indices of organizational effectiveness as well as relationships among them. Such a model would be helpful in understanding the diverse results of previous research.

A current trend in turnover theory building and research is to investigate variables such as intention to quit or intention to search for another position, but such variables may not account for much unique variance in turnover in the context of a model incorporating performance criteria. Nor are such "intention" variables likely to be available to managers or personnel specialists.

The reasonable cross-validation of the 1970-1976 models of turnover for 1977-1978 is encouraging, given the substantial changes in teller characteristics, variables, and relationships observed. It suggests that if the relevant variable set can be identified, prediction of both forms of turnover may be possible at a level significantly and substantially above chance. Organizations that choose to track their performance and personnel practices may be able to address current problems by meaningful use of archival personnel data. The variables investigated are often available in the personnel data base, and such research could be routinely performed.

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The Role of Culture in Comparative Management: A Cross-Cultural Perspective

LANE KELLEY
REGINALD WORTHLEY
University of Hawaii

For at least the last twenty years, the literature has yielded diverse positions on the transferability of modern management principles into different cultures. A review of the research shows that most cross-cultural studies are actually cross-national studies which means comparing socio-cultural, political, and economic systems and not just culture. Two of the more important models are described in terms of the role of culture—the Farmer-Richman model and the Negandhi-Prasad model. One of the models identifies management as a dependent variable, and the other as an independent variable. The research was conducted to contribute to a resolution of this difference. The research design isolated the role of culture by controlling for the political, economic, and educational variables.

The field of cross-cultural or comparative management is in an early stage of its scientific development. Much of the work is concerned with the identification and description of differences across cultures. Several writers (Roberts, 1970; Evans, 1975; Negandhi, 1973; Beres, Portwood, & Portwood, 1977) have suggested the need to move on to conceptual development and hypothesis testing. The present study proposed to contribute to an understanding of the differences in two of the more popular cross-cultural models.

There are conflicting positions in the cross-cultural management literature concerning the relationship between culture and management practices. Harbison and Myers (1959) have stated that as nations industrialize, beliefs concerning leadership change and increasing constraints are placed upon management's authority. This was basically a convergence hypothesis that proposed that managerial beliefs are correlated with the stages of industrial development. In the early 1960s, Winston Oberg proposed the converse: "Cultural differences from one country to another are more significant than many writers now appear to recognize. A [universalist claim] is hardly warranted by either evidence or institution at this stage in the development of management theory" (1963, p. 142). George England (1974) commented on the validity of a "convergence hypothesis" based on the results of 14 research studies presented at a cross-cultural conference at the University of Hawaii. He concluded that country and/or culture did make a significant difference in many of the variables studied. Of the 14 studies, 3 seemed to indicate that countries make little difference in the variables studied. The remaining 11 studies generally found that country and/or culture does make a significant difference. In one of his own studies, England reported that the rank orders of personal value systems of American and Australian managers are correlated .95, but their personal values are correlated only in the .60s and .70s. In a sample of managers from Far Eastern countries, the values of managers from Japan and Korea are correlated .92, but both correlate at much lower levels with the values of managers from other countries in the sample.

In another recent article, Negandhi (1975) states that there is increasing evidence to support the contention that management practices, behavior, and effectiveness are as much, if not more so, functions of such contextual variables as size, technology, location, and market conditions as they are of sociocultural variables. In the same year and the same journal, Bedeian stated, "It is a well-established fact that different cultures possess different organizational norms and behavior standards and that they recognize these as legitimate forms of influence" (1975, p. 287). In summary, the role of culture in terms of management attitudes still is not fixed.

There seem to be basic reasons for the different positions regarding the linkage between culture and managerial attitudes, behavior, and effectiveness. The first problem is the vague definitions of culture. In a recent paper, Child and Kieser state: "Cultures may be defined as patterns of thought and manners which are widely shared. The boundaries of the social collectivity within which this sharing takes place are problematic so that it may make as much sense to refer to a class or regional culture as to a national culture" (1977, p. 2). The second problem is the methodological difficulties of accurate translation and having a representative sample. Many of the studies simply do not have samples that can be considered representative. A third problem is that studies reporting to have a culture-free context are actually national studies. A comparative study of French and German managers not only compares the impact of their cultures, but also of other factors such as their political and economic systems. It might be that the cultures have similar attitudes on those variables closely associated with management but no differences because of culture were reported. For example, the values of American and English managers might be similar, or more similar, than those of Taiwanese and Korean managers. Regardless, the argument can be made that the use of a national sample is not in the strictest sense a sample testing for the impact of culture.

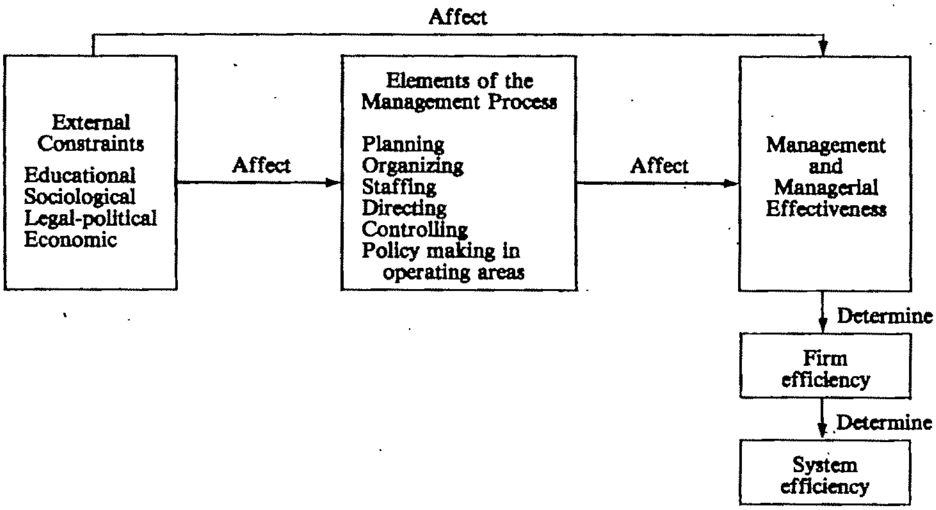
COMPARATIVE MANAGEMENT MODELS

The theoretical models of Negandhi-Prasad (1971) and Farmer-Richman (1965) propose differences concerning the importance of culture. Farmer and Richman describe culture as a major variable in determining both managerial and organizational effectiveness. On the other hand, Negandhi and Prasad's model describes management philosophy as a major independent factor.

The Farmer-Richman model employs four key concepts: comparative management problems—relative managerial efficiency; internal management—coordination of human and material resources; external constraints such as economic, legal-political, sociological, and educational; and managerial efficiency. Schollhammer describes the model as ecological—a passive creature of external constraints and "as a result, there is generally an over emphasis on the necessity for environmental adaption and not enough attention is paid to the fact that management may choose to act in defiance of certain external constraints" (1969, p. 86). This model is graphically depicted in Figure 1.

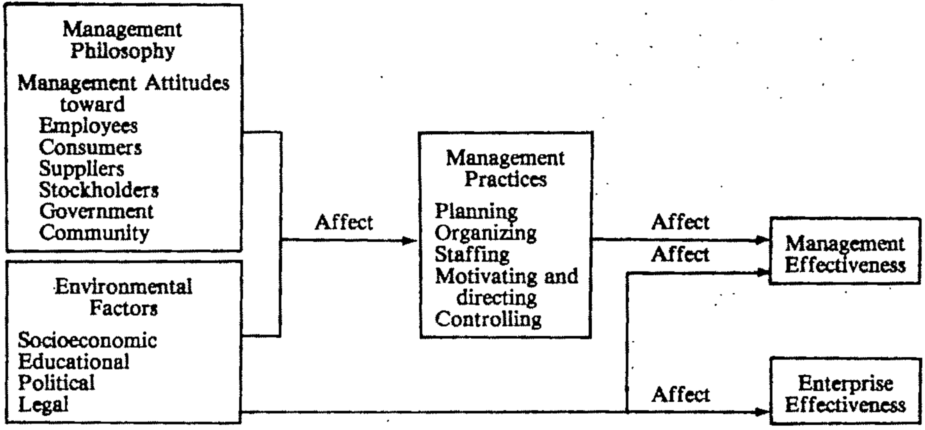
Negandhi and Prasad argue that if the environmental and cultural factors were the main determinants of management practices and effectiveness, one would expect close similarities in the management practices of two comparable industrial enterprises. (They use as an example the two American retail chains—Montgomery Ward and Sears Roebuck—which are basically in the same business and confronted with similar market and

FIGURE 1
Farmer-Richman Model[a]



[a] Farmer and Richman (1965, p. 35).

FIGURE 2
Negandhi-Prasad Model[a]



[a]Negandhi and Prasad (1971, p. 23).

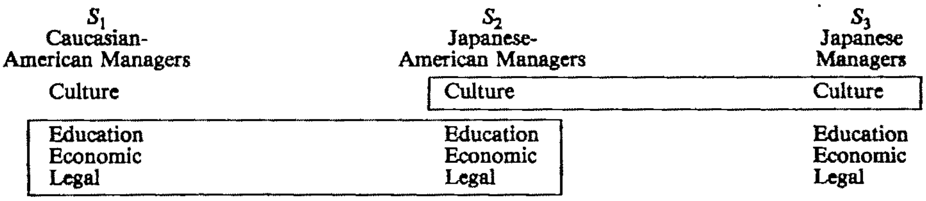
environmental conditions; yet their managerial practices and effectiveness are hardly the same.) Their model identifies basically the same external environment but recognizes management philosophy as an independent variable. Figure 2 illustrates the Negandhi-Prasad model.

PURPOSE OF THE STUDY

The purpose of the present research is to contribute to the resolution of differences between two of the most popular theoretical models in cross-cultural management studies—the Farmer-Richman model and the Negandhi-Prasad model. The sample design used to isolate the role of culture is depicted in Figure 3.

This design reduces some of the problems associated with many of the cross-cultural studies. Negandhi has said that "it appears that culture, although used as an independent variable in most cross-cultural studies, has a most obscure identity and often is used as a residual factor" (1971, p. 26). An examination of Figure 3 supports his contention. Most empirical

FIGURE 3
Research Design for Isolation of Culture



cross-cultural management studies do not isolate the impact of culture but are actually national studies that also reflect other factors such as education and economic and legal systems, which are identified in both Negandhi–Prasad and Farmer-Richman studies. The sample in the present research consisted of three groups—Caucasian-American, Japanese-American, and Japanese managers. The Caucasian-Americans and Japanese-Americans have been exposed to the same economic and legal systems, education, and culture; the only commonality between the Japanese-American and Japanese managers is a cultural link. If the Japanese-American managers' responses are observed to be more similar to the Japanese than to the Caucasian-Americans, the cultural link would seem to be the cause. The operational tests are:

1. One test is for differences between mean responses for the three groups, with differences between Japanese and both American groups pointing to national differences, and differences between the two American groups without differences between the Japanese and Japanese-American groups pointing to cultural differences.
2. Another test supporting an important role for culture in determining managerial attitudes is based on the sequence of responses (means) for the entire set of 15 items, with the predicted positions determined by a review of the literature (Brown, 1971; Drucker, 1971; England & Lee, 1974; Froomkin, 1964; Harari & Zeira, 1977, 1978; Noda & Glazer, 1968; Smith, 1959). It was postulated that the Japanese-American responses would be between those of the Caucasian-Americans and the Japanese because of their Japanese cultural heritage coupled with a lifetime exposure to the U.S. political, economic, and educational systems.

Therefore, there are two basic statistical tests of the hypothesis. The first test is for significant differences between means. No significant differences would indicate no national or cultural effects on managerial attitudes. If the only difference is between the Japanese and the American groups, only national differences would be indicated. If there are no differences between the Japanese and Japanese-Americans but both differ from the Caucasian-Americans, cultural differences would be indicated. The second test, sequence of responses, tests only for the impact of cultural and not national differences. The authors expected national differences to occur, but they also expected that culture would play a role in each group's position relative to managerial attitudes. Therefore the rationale for the second test.

The sample consisted of individuals in managerial positions of financial institutions in Hawaii and Japan. The Caucasian-American and Japanese-American managers were employed in the same organizations, which biased the sample in the direction of the noncultural hypothesis. This is because both groups were exposed and matched in terms of sizes of organization, technology, structure, climate, and other organizational variables. This would seem to make it more difficult for there to be a similarity between Japanese and Japanese-American managers. The sample consisted of 41 Japanese-American managers, 27 Caucasian-American managers, and 62 Japanese managers. The subsamples were similar in terms of management level (all were middle management) and age ($X^2 = .855$, $p > .25$) and education ($X^2 = 1.47$, $p > .25$). It should be noted that the Japanese-Americans in Hawaii comprise the largest single demographic group (excluding the military population) of the state's population. This fact has helped preserve the insularity of Hawaii's cultural patterns, thereby allowing the experimental design described here. This has been supported by Kitano's (1968) research in which he reports that the Japanese in Hawaii retain more "Japanese ways" than other Japanese-Americans because of a larger and more cohesive ethnic culture. The Japanese–American managers in the sample are mainly third generation (*sansei*) and the remainder are fourth generation (*yonsei*).

The 15-item questionnaire was designed to measure differences in managerial attitudes. A 5-point Likert scale ranging from strongly disagree to strongly agree was used. The questionnaire was translated from English to Japanese then verified by having an independent source translate the questionnaire back to English to insure that the English and Japanese versions were measuring the same concept.

RESULTS

Table 1 identifies the management practices and attitudes included in the questionnaire. The direction of the hypothesis was based on descriptive articles and empirical studies of Japanese management. The items covered written procedures (two), centralization of decision making, paternalism, diversified experience, seniority, self-motivation, team work, and company politics.

The first statistical test for difference in responses indicates a dissimilarity of responses between the American managers and the Japanese managers. Of the 11 items that showed significant differences, the Japanese group was separated from at least one American group in all 11 cases and from both American groups on 8 of these 11 items. On only three of the items was a significant difference found between the two American groups. This would imply that culture was not strong enough to create significant differences in managerial attitudes but that there are "national" differences. The major obstacle in this case is the smaller sample sizes involved in comparing the two American groups (27 and 41). This is a result of the highly stratified sample needed to obtain Caucasian-American and Japanese-American managers similar to the Japanese group with respect to industry, management level, and age to control for contextual factors other than nation and culture. The procedure used, distribution-free multiple comparisons based on ranks, requires much larger differences between the smaller groups in order to be designated "significantly different." In many cases the actual differences between the mean

TABLE 1
A Summary of Results from Japanese (1), Japanese-American (2) and Caucasian-American (3) Managers on 15 Likert Scale Statements Concerning Managerial Attitudes

	Order of Sample Results	*Significant Differences*[a]
Group I statements: The predicted order is 3<2<1, with the Japanese managers in stronger agreement.		
1. Self-motivation	Agreement	3<1
2. Self-development	"	3<2<1
3. Group appraisal (2)	"	3, 2<1
4. Centralized decision making	"	3, 2<1
5. Participation in decision making	"	3, 2<1
6. Long term employment	"	3, 2<1
7. Cooperation	"	none
8. Group appraisal (1)	2, 3 reversed	2, 3<1
9. Promotion based on seniority (1)	"	2<3, 1
10. Promotion based on seniority (2)	"	2<1
11. Diversified experience	"	none
12. Respect for formal authority	"	none
Group II statements: The predicted ordering is 1, 2, 3 with the Caucasian-American managers in stronger agreement.		
13. Company politics and career progress	In agreement	1<2<3
14. Written procedures (2)	"	1<3
15. Written procedures (1)	3<1<2	none

[a]Significant differences were determined with distribution-free multiple comparisons based on Kruskal-Wallis rank sums.

responses of the two American groups were comparable to differences between the American groups and the Japanese group. Also, if a higher level of significance was used, differences would show up between the two American groups on several other items.

The second statistical test, the sequence of responses, supports the role of culture in the formation of managerial attitudes. Of the 15 items' sequence of means, 9 agree exactly with the predicted ordering. The probability of observing as many as 9 out of 15 sequences in the exact expected ordering (assuming a binomial model with $P=1/6$, the 6 possible orderings) is only .00019. Of the six items in which the ordering differed from the hypothesis, only the two American groups differed in five of the cases, and only one of these (number 9) revealed any significant difference between the American groups. Only item number 15 showed any substantial difference in ordering than hypothesized, and no significant difference is found on this item between any of the groups. The reader is reminded that in five of the six sequences the Japanese responses were in the predicted position, but not the responses of the Japanese-Americans. Even though they were "out of place," they were not significantly different from the Caucasian-American responses. The reader is also reminded of the very small probability (.00019) of having 9 out of 15 sequences in their exact predicted position.

It was expected that it would be more difficult to separate the two American groups from each other in terms of managerial attitudes than to show differences between them and the Japanese groups, and this is supported by the results. Of the 11 items that showed significant differences, the Japanese group was separated from at least 1 American group in all 11 cases and from both American groups on 8 of these 11 items. On only three of the items was a significant difference found between the two American groups. The authors feel that the lack of significant differences between the two American groups, despite the preponderance of items in predicted order, is due mainly to the difficulty involved in obtaining large samples that are comparably matched in terms of education, age, and managerial level in a similar organization, especially for these two ethnic groups.

CONCLUSION

The purpose of this study was to isolate the role of culture in order to test its relationship to managerial attitudes. This was accomplished by a research strategy that took samples of Japanese from Japan and Hawaii and Caucasians from Hawaii in order to look for similarities and differences in their managerial attitudes. This sample design allows for an isolation of the role of culture by having culture the common factor between Japanese in Hawaii and Japan. As for the two American groups, the Japanese-American and Caucasian-American managers have been exposed to the same sociopolitical systems—legal, political, and educational—plus the same organizational environment. The Japanese subsample was similar to the American sample in terms of industry, management level, and age. The American subsample of Japanese-Americans and Caucasian-Americans was similar in terms of all of the external factors identified by both the Negandhi-Prasad and the Farmer-Richman models except culture. The findings suggest the importance of both national and cultural difference. The first statistical test designed to isolate both national (difference between Japanese and the two American groups) and cultural (difference between the two American groups) effects on managerial attitudes supported much less fully the cultural differences than national ones. Two reasons, sample size and the multiple comparison procedure (designed to be 95 percent confident of all inferences simultaneously on an item, instead of separate 95 percent confidences on each of the three comparisons per item), led to very few items pointing out significant cultural differences.

However, the second test, using all 15 items at once (instead of separately) and observing correct predicted orderings based on both national and cultural differences, points much stronger to the existence of both factors in determining managerial attitudes. In 9 of the 15 items, the sample ordering agrees exactly with the predicted ordering. There are six possible orderings in each item, and if there were no national or cultural differences the probability of predicting the sample order would be only one in six. The probability of predicting as many as 9 out of 15 sequences just by chance alone is only .00019. This indicates that a theory of both national and cultural differences is highly supported by the ability to predict the correct ordering in so many cases. The nine correct predicted orderings are even more important when it is noted that there are some items in which there seem to be no real differences in attitudes either culturally or nationally. Items 11, 12, and 15 (Table 1) are illustrative of these; no significant differences are found. In the other three items in which the sample orderings were not as expected, in only one case was there a significant difference that was in the reverse of the predicted position between the two American groups (item 9). Further research is required to come to any conclusion concerning the items in which the mean responses, although not significantly different, were reversed. Perhaps these reversals have been caused by the problems associated with two different cultures functioning within the same organization; especially when one traditionally has been considered a minority group. For example, in studies of comparisons of Japanese-American and Caucasian-American college students in Hawaii, it was found that the *sansei* (third generation) male appeared to be "more introverted, more anxious...and lower in leadership potential" (Meredith, 1977); there was "an under-representation in leadership positions" (Barton & Kalish, 1961); and "the Japanese-American was experiencing a 'leadership crisis' " (Burma, 1953). These differences may explain in part the unpredicted reaction of the Japanese-Americans to "group appraisal," promotion based on seniority and respect for formal authority.

The results of this study support the position of Farmer and Richman (1964) on the role of culture in the formation of managerial attitudes and not the position of the Negandhi-Prasad model. This does not negate the importance Negandhi places on other contextual variables such as organization size, technology, location, and market position. For example, in two research articles by Harari and Zeira (1977, 1978), it is reported that Japanese working in foreign-owned multinational corporations considered clearly defined goals and evaluation to be more desirable than did Japanese employees in Japanese corporations. The results of the Harari and Zeira studies and the contextual factors emphasized by Negandhi's (1975) research—size, technology, location, and market—were shown to be significant in their research, but the present study supports the importance of culture—at least for the Japanese culture in terms of the formation of managerial attitudes.

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An Examination of the Central Life Interest Scale[1]

JOHN G. MAURER
Wayne State University
DONALD J. VREDENBURGH
City University of New York
RICHARD L. SMITH
Wayne State University

This paper investigates the Central Life Interest (CLI) scale using four distinct respondent groups. Attention is focused on ability of the items to discriminate respondents across groups as well as internal consistency and dimensionality of the scale. The results raise questions about the psychometric properties of this scale.

Central Life Interest (CLI) was defined by Dubin (1956) as an individual's preference for a particular setting in which to behave and was measured by a 40-item scale comprised of 4 dimensions: informal group experiences, general everyday experiences, the formal aspects of membership and behavior in organizations, and the technological aspects of the environment. According to Dubin, "Each question represented an activity that had an approximately equal likelihood of occurring in connection with some aspect of the job or workplace, or at some definite point in the community outside of work" (1956, p. 134). Selection of a job or workplace locale for the activity was called a job-oriented response; selection of an off-the-job locale for the activity represented a non-job-oriented response. A third possible response was an indifferent or neutral one. Individuals selecting a job-oriented response on 50 percent of the items and those who had a total of 70 percent of their responses in the job-oriented and indifferent categories (provided the percentage of job-oriented responses was not less than 40 percent) were designated as job-oriented. Those workers who failed to meet either criterion were designated non-job-oriented.

There have been at least 27 reports of uses of either the original 40-item scale, a revised 32-item version, or shorter forms of the scale. In addition to 19 uses reported by Dubin, Taveggia, and Hedley (1975), the present authors have located 8 others (Dubin & Champoux, 1974; Dubin & Champoux, 1975; Dubin & Champoux, 1977; Dubin, Champoux, & Porter, 1975; Taveggia & Hedley, 1976; Taveggia & Ross, 1978; Taveggia & Ziemba, 1978; Wiener & Gechman, 1977). In addition, CLI findings have been widely cited in support of empirical findings or theoretical arguments. In this regard, 28 citations of the 1956 Dubin study alone were found.

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Early criticisms of the CLI scale and the conclusions Dubin derived from it were offered by various writers. Kornhauser stated that "the methods and data of that research do not all justify the conclusion that work is not of central significance for workers" (1965, p. 328). Wilensky states that "the measure may be weak" and that "Dubin's assumption that each question represents an activity that is as likely to occur 'in connection with some aspect of the job or workplace' as 'at some definite point in the community outside of work' seems dubious" (1964, pp. 151-152).

The CLI literature contains few references to any formal examination of the validity or reliability of the CLI scale. Regarding concurrent validity, Goldman (1968) related the CLI scale to other measures, e.g., regular readership of *The Wall Street Journal*, and reported that seven of the eight indicators judged relevant to the validity of the central life interests questionnaire differentiated between job-oriented and non-job-oriented middle managers. The differences were small and no tests of statistical significance were provided. Other studies reported significant associations between CLI and job involvement (Maurer, 1968; Latta, 1968; Maurer, 1972) and occupational aspiration (Maurer, 1968). Another reference derives from a symposium (Dubin, Taveggia, and Hedley, 1975) at which CLI scale structure problems were indicated, but in later publications by these researchers no reference is made to this dimensionality problem. See, for example, Dubin, Taveggia, and Hedley (1976, pp. 281-341). Dubin and Champoux (1975) reported split-half reliabilities for a 32-item CLI scale of "around .90." However, no information was provided regarding assumptions about level of measurement, and insofar as the CLI scale is nominal in nature it is important to know what kind of analysis generated this reliability coefficient. The last reference reports the results of a factor analysis by Saleh and Hosek (1976) of 65 items relating to job involvement, 14 of which derived from the CLI scale. These 14 items were first converted to a Likert-type scale, and results showed that these 14 items joined with items from two other measures to comprise a central life interest factor of job involvement.

It appears then that a lack of systematically derived evidence of validity and reliability exists with regard to the much used and often cited CLI scale. Because of the underlying indirect logic of the CLI measure, that is, a preferred location for performance of a given activity reflects a particular attitudinal or value orientation, its psychometric properties assume particular importance. The purposes of this study are to analyze the items and to examine aspects of the reliability of the Dubin 40-item CLI scale across four respondent groups. Attention is focused on the ability of the items to discriminate across groups as well as on the internal consistency and underlying dimensionality of the scale. Original data using the 40-item CLI scale were available to the present authors, and they chose to begin the analysis using that data, rather than the revised 32-item or one of the shorter forms, for the following reasons: (1) The results of the original 1956 Dubin study that employed the 40-item scale are cited frequently in the current literature; (2) Of 18 studies reported by CLI researchers between 1956 and 1973, 9 used the original 40-item scale, and 9 employed a modified scale; (3) The CLI scores of different samples have been compared even though results of the different studies have been based on different scales, that is, the 40-item scale and a revised version.

METHOD

Data Sources

Table 1 presents information about the four heterogeneous survey groups used in the analysis. The industrial supervisors (Maurer, 1968) were at the first through the third managerial level and were employed in six Michigan firms, five of which were engaged in production or assembly operations. There were 54 first-level supervisors and a total of 57 second- and third-level supervisors. The over-the-road truck drivers (Latta, 1968) were union members and employed by 16 common and contract carriers of interstate motor freight. The occupations of the evening business school students/full-time employees (Maurer, 1972) were very heterogeneous. Only 22 of 268 occupations involved more than one individual, and the maximum number in one occupation was 5. The medical technologists (Maurer & Cole, 1976) were registered (ASCP) and were employed in eight hospital laboratories. Of the laboratory technologists, 31 were supervisors. Table 1 also presents for these groups the percent indicating that

TABLE 1
Data Characteristics

	Part-Time Students/ Full-Time Employees	*Industrial Supervisors*	*Over-the-Road Truck Drivers*	*Medical Technologists*
Number of respondents	268	111	349	144
Response rate (percent)	100.0	33.5	32.2	61.8
Median age of respondents	26	45	42	28
Median education (years)	15	[a]	11	16
Median time with organization (years)	3	[a]	8	4
Median time on job (years)	2	[a]	17	2
Percent male	86	[a]	100	15
Percent married	69	[a]	[a]	54
Percent for whom work is a central life interest	9	54	12	5

[a] Data not available.

work is a central life interest and the response rates. It should be noted that data collection occurred by mail for all survey respondents except the part-time student group.

Data Analysis

The examination of the CLI instrument consists of three analyses: item discriminatory ability, internal consistency reliability, and subscale structure or dimensionality. In each analysis each of the four respondent groups is examined separately. The first analysis concerns the distribution of responses to each item in the CLI scale. The rationale for this preliminary assessment is that the ability of an item to differentiate diverse groups is limited by possible response biases. The need for this analysis derives further from the nature of the scale in that each item should contain alternate behavioral settings that are mutually exclusive.

The internal consistency analysis attempts to determine the extent to which the items measure some common underlying construct. This was examined in part by assessing the magnitude of the relationship of each item with the overall scale score. Because the overall score for the scale is a dichotomous variable (job-oriented or non-job-oriented) but the items as scored are trichotomous, the relationships of the items to the total scale score are appropriately assessed with Kendall's tau *C* (Kendall & Stuart, 1961). The internal consistency of the items is examined further by an approach analogous to a split-half reliability analysis. A random division of the 40 items into two groups of 20 and computation of a CLI score for each 20-item set allows these two dichotomous scores to be correlated by means of a phi coefficient. To insure the stability of this split-half estimate of internal consistency reliability, 50 such random splits were made and the 50 phi coefficients were averaged using Fisher's *Z* transformation. It is appropriate to use the phi measure of association because of the nominal nature of the scores.

However, because a typical prophecy formula could not legitimately be assumed to produce an unbiased estimate of the 40-item phi coefficient (the CLI does not produce a total scale score that is a linear composite of individual items), it became necessary to investigate the possibility of a bias in the prophecy estimate. This was accomplished through a procedure of randomly drawing 50 pairs of 10-item subsets and computing phi coefficients between pairs. Thus, it was possible to compare the 50 10-item subset phi coefficients with the 50 20-item subset phi coefficients and thereby assess the error incurred in using the Spearman-Brown prophecy formula to estimate the 40-item CLI scale's split-half reliability.

An important issue connected with the CLI scale is its scoring, and this paper investigates scoring of the CLI scale through the split-half reliability analysis. The scoring procedure evident in the CLI literature collapsed the response information into two categories—job-oriented and non-job oriented. However, if the item responses are scored ordinally, such that 3 equals a job-oriented response, 2 an indifferent response, and 1 a non-job-oriented response, product moment coefficients can be computed and compared to the phi coefficients, thereby allowing an assessment of the cost of losing information through nominal scoring.

The final analysis investigates the dimensionality of the CLI scale. Using a tau *B* input matrix, a minimum method hierarchical cluster analysis (Johnson, 1967) examines within each of the four groups the four cluster solution, thereby allowing comparisons with Dubin's original four a priori dimensions as well as comparisons across groups.

RESULTS

The intent of the first analysis was to ascertain through frequency distributions the degree to which each item in the CLI scale discriminated among respondents. (The complete frequency distributions or summary tables are available from the first author.) These distributions show that for 19 items at least 50 percent of the respondents in each of the four distinct groups selected the same response code. Using that same criterion, this occurred for 10 other items in 3 of the 4 groups. Thus for 29 of 40 scale items 50 percent of a group's respondents selected the identical response category across 3 or all of 4 groups. These results point to a large number of items in the CLI scale that appear to lack the capability to discriminate respondents across heterogeneous groups.

The examination of the CLI scale's reliability focused on internal consistency. The internal consistency of the scale was initially assessed through an item/total approach that used Kendall's tau *C* to measure the relationship of each item to the total central life interest scale score. (The complete set of tau *C* item/total coefficients is available from the first author.) In the absence of a generally accepted criterion applicable to interpreting Kendall tau *C* item/total coefficients, this study used a .01 significance level as the indicator of an acceptable item/total relationship. This item/total analysis showed that six items in all four survey groups failed to relate to the CLI scale score at the .01 level, and seven other items did not attain that level across three of the four groups.

Internal consistency received further examination through a split-half analysis. Table 2 reports the results of using the phi measure of association to determine the relationship of random split-halves of the CLI scale. This

TABLE 2
Split-Half Reliability Coefficients

Group	*Range of Phi Coefficients*	*Mean Phi*	*Spearman-Brown Phi*	*Corresponding Mean r*
Students	.260-.473	.371	.542	.588
Supervisors	.132-.445	.296	.450	.494
Truck drivers	.299-.475	.390	.562	.609
Medical technologists	.206-.438	.243	.391	.459

table presents for each group the range of phi coefficients generated by 50 split-half analyses, the mean of those 50 coefficients, and the phi coefficient resulting from application of the Spearman-Brown prophecy formula to the mean phi. Uniformly, these results are of low magnitude, indicating low split-half reliabilities and reaffirming a less than desirable internal consistency for the CLI scale. Furthermore, the low Spearman-Brown phi coefficients overestimate the split-half reliabilities. This bias became evident from comparing the 10-item Spearman-Brown phi coefficient to the 20-item mean phi. Clearly, the degree to which the 40-item CLI scale measures a common, underlying construct is questionable. The fourth column in Table 2 presents the Pearson correlation coefficient computed after applying an ordinal scoring procedure to the scale, and comparisons of the mean phi and mean Pearson coefficients indicate a possible loss of information due to the dichotomous tabulating procedure used in CLI research.

The hierarchical cluster analysis examined the CLI instrument's internal structure or dimensionality, whose four a priori dimensions were mentioned previously. Table 3 summarizes the four-cluster solution for each group. The results reflect some similarity of cluster composition across the four groups but limited resemblance to Dubin's a priori dimensions. Specifically, cluster D appears similar to clusters L and R, cluster B resembles cluster M, and E is similar to N. Cluster A appears to resemble Dubin's informal dimension, but the other hypothesized dimensions are not reproduced to any appreciable degree. Chi square analyses corroborate this observation, indicating that only the student group clusters relate statistically significantly to the a priori dimensions.

Revisions of the CLI Scale

The original 40-item CLI scale has been revised into shorter versions. Insofar as no discussion of the criteria used to alter the scale has appeared in the CLI literature, the analyses prepared as part of the present study offer a desirable opportunity to compare the original and shorter versions. The revision of the 40-item scale to a 32-item one has been accomplished through the deletion of 11 items and the addition of 3 items. The resulting scale contains eight items in each of the four dimensions, thus eliminating an a priori unequal weighting across scale dimensions. Considering first the 19 items for which in all 4 groups at least 50 percent of the respondents selected the same response code, 12 of those poor items were retained in the shortened 32-item scale. Alternately, of the 11 items deleted to develop the 32-item version, 8 were desirable deletions in that they failed to discriminate the four groups. Thus the deleted items were generally poor ones, but based on capability to discriminate respondent groups, more poor items might have been eliminated to improve the scale. With regard to the item/total relationships, of those 6 items for which item/total relationships failed to reach the .01 significance level for all 4 groups, only 2

TABLE 3
Cluster Analysis of CLI Dimensionality

A Priori Dimensions	*Students*	*Supervisors*[b]	*Truck Drivers*	*Medical Technologists*
Informal dimension	Cluster A	Cluster E	Cluster J	Cluster N
1[a]	1	1	1	1
4	8	10	21	6
8	13	18	23	10
12	16	23	30	33
20	22	30	31	35
21	24	35		37
22	28	37	Cluster K	38
24	29		5	
28	31	Cluster F	8	Cluster P
29	33	2	11	2
33	35	3	16	4
35	37	5	18	9
37		8	24	11
40	Cluster B	9	28	17
	4	13	29	19
Formal dimension	6	16	33	20
2	15	21	35	28
11	17	25	37	30
13	20	39		31
15	21		Cluster L	36
23	38	Cluster G	2	
31		6	3	Cluster Q
34	Cluster C	7	6	5
	2	11	7	15
Technical dimension	5	12	9	16
3	23	14	10	21
9	26	17	12	25
14	30	22	13	34
16	34	24	14	
17		26	19	Cluster R
19	Cluster D	27	22	3
26	3	28	25	7
30	7	29	26	8
32	9	32	27	12
36	10	33	32	13
	11	34	34	14
General dimension	12	36	36	18
5	14		39	22
6	18	Cluster H	40	23
7	19	4		24
10	25	15	Cluster M	26
18	27	19	4	27
25	32	20	15	29
27	36	31	17	32
38	39	40	20	39
39	40		38	40
Chi square relating group with a priori dimensions:	22.51 ($p<.01$)	5.00	10.80	12.57

[a] Item number.
[b] Item 38 excluded from this analysis only.

were among the 11 deleted items. Of the 11 deleted items, the item/total relationships were unacceptably low for 2 items across all four groups and for 2 additional items across three groups. For these reasons, and because some of the deleted items contributed to the scale's internal consistency reliability, according to the .01 item/total criterion, it appears that attention to internal consistency might have improved the revision of the CLI scale.

Although the 32-item scale represents the major revision of the 40-item CLI scale, Taveggia and Ziemba (1978) recently developed a shortened 6-item version. However, changes in item content result in the present authors' ability to match with certainty only 2 of the 6 items to items in the 40-item scale. Thus, it was impossible to use the present analyses to examine the 6-item version of the CLI scale.

DISCUSSION

Assessing the degree to which work constitutes a central life interest is critical to understanding workplace behavior, behavior off the job, and their relationship. The importance of work in a person's life should be a primary concern of the individual differences perspective on management and organizational behavior (Lawler, 1974). Given this importance, it is noteworthy that little has been done to evaluate such a mature and widely utilized instrument as the central life interest scale. The results of the present analyses raise questions about the scale's reliability and the discriminatory ability of the items, such that previous findings and conclusions based on the CLI scale may deserve reassessment. Rigorous tests of the scale's convergent and discriminant validity are required. Future research also is needed to ascertain the degree to which completion of the CLI scale may be influenced by social desirability or other response set predispositions.

From a larger perspective, it appears that more emphasis needs to be placed on the researcher's responsibility to address the fundamental issues of scale validity and reliability. An obligation also exists for those who use empirical findings in support of theoretical positions to be cognizant of the nature of the research design and scales used in generating the findings. Two longer-run suggestions would include the development of instrument validation centers (e.g., a select number of schools' research bureaus could specialize in the validation of scales) and the requirement of independent replication of empirical research prior to publication. This latter suggestion might lessen emphasis on the interesting and new in a given management journal but serve to reinforce adherence to the scientific method in generating knowledge.

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Research Notes

THE EVENT OF CEO SUCCESSION, PERFORMANCE, AND ENVIRONMENTAL CONDITIONS

RICHARD N. OSBORN
Battelle Human Affairs Research Centers, Seattle
LAWRENCE R. JAUCH
THOMAS N. MARTIN
Southern Illinois University at Carbondale
WILLIAM F. GLUECK
University of Georgia

A number of writers have dealt with the topic of succession. But few have focused on predicting the event of replacing the chief executive officer (CEO). Rather, analyses of succession often are concerned with the differential effects between an outside and an inside replacement, the rate of succession in top management over time, the skills and background of the new CEO, and/or the degree to which performance in one year can be traced to a change in CEOs in some earlier period.

These analyses, however, do suggest two themes. Various aspects of succession are linked to (a) performance and (b) environmental volatility. They have not explicated what specific components of performance or environmental volatility are important in predicting the event of replacing the chief executive officer. Yet the replacement of the CEO, itself, often is considered a major event in the history of the organization.

The purpose of this paper is to examine the specific aspects of performance and environmental volatility that may be related to the event of succession by building upon related literature. This exploratory analysis is designed to address some key issues and raise a number of conceptual and measurement questions. For example, a somewhat novel methodology called a "structured content analysis of cases" is used to study the event of succession in a nonrandom sample of 313 large industrial corporations from 1930 to 1974.

Explanations of the two major themes can be traced to four bases of succession-related literature. First is the most general and perhaps widespread "causal model" of succession. A record of poor financial performance causes replacement of the CEO (Helmich, 1975, 1977; Helmich & Brown, 1972; Lieberson & O'Connor, 1972). Management lore buttresses this performance approach from the classical economics literature and adds a normative component. Not only will the CEO be "allowed to pursue other interests," but he/she should be replaced by someone with greater vision, charisma, and/or managerial talent.

A parallel to financial performance and a second performance approach emerges from the literature concerned with corporate strategy. Strategy, it is argued, can and/or should be used to judge top management. Corporations that cannot develop "good" strategy may need a change in the CEO (Gilmore, 1973; Jauch, Osborn, & Glueck, 1977; Kudla, 1976). Because there is little consensus on what constitutes "good" strategy, the following is posed: Firms facing succession should experience more strategic changes than nonsuccession firms because the new CEO would be expected to develop new, more appropriate corporate strategy.

The environmental volatility theme is suggested by Thompson (1967), who argued that organizations that fail to buffer themselves from external uncertainty may be ripe for succession. Thompson's basic arguments have been expanded in two related but different ways.

Osborn and Hunt (1974) and Tosi, Aldag, and Storey (1973), among others, have divided the environment into task, industry, and socioeconomic segments. Volatility in any of the three segments may induce succession (Osborn, Hunt, & Jauch, 1980). Another group of scholars have focused on the "important" task environment agents using a power-political approach. The literature here argues that volatility by specific types of agents in the firm's environment may upset the "dominant coalition" and result in a new "central power figure." Interdependent agents are concentrated on. Pfeffer (1972) and his colleagues (Pfeffer & Leblebici, 1973; Pfeffer & Salancik, 1977), for instance, argue that a change in ownership upsets the dominant coalition and thus is directly related to succession. As will be outlined in the methodology section, combining these two perspectives suggests that different categories of environmental volatility could be linked to succession.

In sum, a literature review of executive succession suggests two major themes, which themselves can be broken into four approaches. One, succession is a result of poor performance. Financial performance is stressed by some. Others see the adequacy of corporate strategy as the key to the performance theme. Two, succession is an organizational response to environmental volatility. One group of scholars casts a broad net to cover many aspects of the environmental volatility theme. Another group uses a power-political approach to link interdependency, volatility, and succession. None of the four approaches purports to provide a theory of succession, but authors in each group have linked their respective approaches with succession. Are performance and environmental volatility associated with the event of succession? Which aspects of each are most important? These are questions raised and empirically explained by the present study.

Method

A structured content analysis of cases was used to gather relevant data on 313 large industrial firms. This type of analysis involves multiple ratings of published cases based on a content analysis schedule. See Jauch, Osborn, and Martin (1979) for details. Although not ideal for all research questions, this methodology is well suited for the purposes of this investigation. Many published cases can provide sufficient detailed information on profits and strategy in a large enough sample to insure an adequate number of succession events and over a long enough time period to incorporate wide variations in environmental conditions.

For analysis of corporations, *Fortune* has provided detailed accounts of the environment, strategy, and performance of larger corporations for some 50 years. Over 1,200 case descriptions from 1930 to 1974 were skim read to identify those containing environmental, strategy, and performance data. Some 630 appeared to contain complete data. Using a random number table, two thirds (420) were selected for detailed reading. Of these, 313 were publicly owned industrials for which there were sufficient data from *Moody's Industrial Manual* to calculate return on assets.

It is possible that *Fortune* reports may be somewhat biased. Articles are written for businessmen and may have a pro-business bias. Miller and Freisen (1978), for example, argue that *Fortune* accounts may be similar to descriptions by executives. One expects more basket cases and success stories. These may make better news than stable unexciting firms. Cases are written by professional journalists who may or may not have been guided by a series of naive hypotheses. Lastly, it is unlikely that *Fortune* has equal access to all larger industrial corporations or provides equally detailed analyses across all industries, all possible strategies, or environmental conditions.

A content analysis schedule was used to analyze the *Fortune* cases (the schedule and the list of 313 firms are available from the senior author on request). To insure consistency, three evaluators were given the content analysis schedule and the definitions of important terms. They completed the content analysis schedule for each organization by ranking up to five of the most important environmental conditions and strategies provided in the case description. There was perfect agreement among the three in approximately 90 percent of the cases. Miller and Freisen (1977) and Yin and Heald (1975) indicate that this is more than adequate multirater reliability. The majority opinion was accepted in the 10 percent disagreement analysis.

Measures

Succession (new CEO) was rated as either present or absent. Succession was considered present when there was a replacement of the chief executive officer. Reasons for replacing a CEO were not considered because such explanations may have been self-serving or only partially accurate.

Financial performance was reported return on assets (ROA) one year prior to publication of the case, that is, financial performance two years prior to the case. It was noted that reported profits a year prior to, the year of, and the year after the case were correlated above .9. Thus, the one year measure also shows a three year history for any one firm. This data also correlated significantly ($r = .73$) with profitability estimates taken directly from the *Fortune* cases. By firm, more variability in profits is expected over a longer time period. Across the sample firms there were wide variations in ROA with some firms posting losses and others high profits at any given time period.

In measuring strategy, a few problems are noted. One, many analyses of corporate strategy are ideosyncratic and typologies of strategy are just beginning to emerge from the literature. Two, the detailed information needed to assess a firm's strategy is difficult to obtain, particularly over a large number of firms across a long enough time period to find a substantial number of succession events. The use of the structured content analysis of cases helped to solve this problem. Three, because empirical analyses of corporate strategy are rare, it was assumed that all measured changes in corporate strategy were "equally likely" predictors of succession.

Specific alterations in corporate strategy, 24 in number, from Glueck's (1976) typology were placed in 1 of 8 categories. The eight were: (1) financial—sale or liquidation of the organization or a major subsidiary; (2) mission—backward or forward integration, launching new products in new markets, and/or becoming a captive to a supplier or distributor; (3) market development—increasing or decreasing the number of markets served with existing products; (4) market penetration—altering the sales or promotion efforts in existing markets with existing products; (5) product extensification—altering the number and range of products offered via similar distribution channels; (6) production efficiency—embarking on a major cost cutting program, cutting research and development, and/or cutting production capacity; (7) goal emphasis—altering expectations for growth and/or profits; and (8) mergers—merger with firms using similar technologies and/or having similar products in similar markets and/or conglomerate mergers.

For predicting succession, it is assumed that a change in strategy indicates a belief that previous strategy was less appropriate. Measurement was limited to only the strategic changes to which top management was committed. The question was, which strategic changes were central to the firm's overall strategic posture? Up to five strategies that were central to the firm's strategic posture were considered.

For each strategic category, one score was desired that (a) considered the relative importance of a strategic category vis-a-vis others for a particular organization and (b) considered the relative importance of a strategic category across the sample organizations. Thus, for each organization the ranks within each category were summed and then divided by the possible sum of ranks. These scores were then standardized to a z score (mean $= 0$, SD $= 1$).

All measures of environmental conditions also were taken from the content analysis schedule. Categorization for socioeconomic and industry volatility followed Osborn and Hunt (1974) and Osborn (1976).

Consistent with the power political perspective, volatility by agents in the environment was categorized separately. Overall economic conditions at the time of the case were coded as depression, recession, recovery, or prosperity (Osborn, 1976). Measures of volatility were based on a procedure virtually identical to that used for strategy. Evaluators were given a list of possible environmental alterations (enumerated below). They ranked up to five important environmental challenges facing the firm. As with strategic alterations, the raw scores were summed, then divided by the possible sum of ranks, and then standardized.

Socioeconomic volatility consisted of changes in the economy (e.g., from prosperity to recession) and in economic policies as well as alterations in the distribution of wealth that appeared to affect the demand for the firm's products. There were three measures of industry volatility: (1) consumer volatility included changes in consumer attitudes and pressure by consumer groups; (2) technological volatility included changes that shortened the product life cycle of existing products or changed the nature of the major product(s) of the industry; (3) governmental volatility centered on alterations in governmental regulations and political pressure put on an industry.

Volatility of agents in the environment were placed into five categories: (1) competitor volatility centered on price changes and the introduction of new products; (2) supplier volatility dealt with alterations in the price and availability of raw materials and subassemblies; (3) owner volatility was assessed by major changes in ownership and a takeover bid; (4) labor volatility was a major change in employee unionism; (5) distributor volatility centered on an excess or shortage of capacity by purchasers.

Multiple discriminant analysis was used to examine the discriminating power of variables to predict organizations that did or did not experience succession. As a follow-up, a stepwise discriminant analysis was used to isolate the more important predictors. Prior to analysis, data were checked for industry and time period effects. There were no substantial alterations by 10-year time periods, nor did partialling for industry type alter the intercorrelations.

Results

Of the 313 organizations, 96, or 31 percent of the sample, experienced managerial succession. Using all 19 variables, there was correct classification for 76 percent of the nonsuccession and 67 percent of the succession firms (73.2 percent for both categories). The canonical correlation was .42 with an associated chi square of 57.7 ($p < .001$). Of the 19 variables, 6 were significant predictors of succession (Table 1). They were: prior profits, financial strategy, merger strategy, socioeconomic volatility, supplier volatility, and owner volatility.

Table 1 also indicates the results for the stepwise procedure using just the six significant predictors. Here, accurate classification occurred for

TABLE 1
Discriminant Analysis of Organizations Experiencing and Not Experiencing Managerial Succession

Variable	Univariate F	Multivariate F to Remove	Standardized Discriminant Function Coefficients: All Variables	Standardized Discriminant Function Coefficients: Stepwise
Performance measures				
1. Prior profits	4.50*	4.14*	–.25	–.30
Strategic changes				
2. Financial strategy	16.27**	16.27**	.52	.49
3. Mission strategy	.28		.01	
4. Product extension strategy	.02		.15	
5. Market penetration strategy	.65		.23	
6. Market development strategy	–.19		–.14	
7. Production efficiency strategy	.13		.15	
8. Goal emphasis strategy	1.89		.23	
9. Merger strategy	5.80*	5.01*	.43	.37
Environmental conditions				
10. State of the economy	.47		–.09	
11. Socioeconomic volatility	8.28**	4.82*	.29	.33
Industry conditions				
12. Consumer volatility	1.87		.23	
13. Technological volatility	.01		.06	
14. Government volatility	.02		.08	
Task agents				
15. Competitor volatility	.56		–.22	
16. Supplier volatility	7.51**	5.86*	.31	.36
17. Owner volatility	13.13**	9.09**	.25	.31
18. Labor volatility	1.52		.14	
19. Distributor volatility	.29		.01	

*$p<.05$
**$p<.01$

70.3 percent of the organizations. The canonical correlation was .37 with an associated chi square of 44.3 ($p<.001$). There was correct classification for 74.2 percent of the nonsuccession and 61.5 percent of the succession firms, respectively. Data do not suggest any moderating effects among the predictor variables. Multicollinearity does not appear to be a substantial problem (predictor r's ranged from .34 to –.25).

Discussion

There are several possible interpretations of these results that raise a number of conceptual and measurement issues. From a global view, the two dominant themes in the succession literature have been supported using a different methodology. Succession was linked to performance. Succession firms had lower profits and experienced more changes in financial and merger strategies than did nonsuccession firms. Succession also was linked to environmental volatility. Alterations in the socioeconomic setting, ownership, and suppliers differentiated succession from nonsuccession firms. But only 6 of the 19 predictors were important. Nor did subsequent analysis with various additive combinations of these measures yield statistical significance. In sum, the global themes do provide a base point for analyzing succession. But in any movement toward a theory of succession it also is important to examine the data in light of the four views underlying the two themes.

First, in examining financial performance, profits were found to be a weak predictor of succession. Yet it is important to recognize a number of points. Return on assets is but one of a number of performance indicators (Kirchhoff, 1977). Others could yield a clearer picture. For this sample ROA was comparatively stable over a three year period. As others have suggested, the profits of large corporations are difficult to change quickly and dramatically. Before dismissing this explanation of succession, a whole series of questions arises. How many years of "low" profits are needed to induce succession? Is a pattern of decline more important than a "low" return on assets? Is it possible that financial performance is a more important predictor of succession for smaller systems and/or for nonindustrials? How did some CEOs survive in the face of a poor profit picture?

Turning to the corporate strategy view, another series of questions arises. If management is judged on its strategy, why were only two types of strategic change related to succession? Obviously the conception of strategy or its measurement used in this study could be faulty. But both of the significant predictors of succession centered on the legal domain of the firm. Divestiture (financial strategy) and mergers (merger strategy) were significant predictors. Why were the product-market strategies, given so much prominence in the strategy literature, not associated with an important corporate event? Is the emerging emphasis on goal priorities and mission also found in the strategy literature (Richards, 1978) critical for succession in industrial firms?

The two views underlying the environmental volatility theme also give rise to a number of questions for future research. Volatility in some portions of the socioeconomic setting and by some task environment agents was associated with succession. But it also is important to look at the nonsignificant findings. Volatility concerning industry-related factors was not important. To what extent have corporations gone so far beyond the boundaries of a single industry that a substantial revision in the concept of industry is needed? Volatility in areas so frequently mentioned by executives such as consumers, distributors, government, competitors, labor unions, and technology were nonsignificant in this study. Are these identifiable threats that can be buffered and that most CEOs have met successfully earlier in their careers?

As a predictor of succession, the importance of supplier volatility can be seen as underscoring the difficulty of industrials in buffering their comparatively rigid technical cores (high fixed capital investment) from alterations in the availability of basic raw materials. This is consistent with Thompson's (1967) analysis, which implicitly combines reliance upon outsiders with volatility by outsiders. Yet volatility by some outsiders on which these sample firms rely was not associated with succession. For instance, both supplier and labor volatility could threaten the outputs of organizations with high fixed investment. But labor volatility was not important in predicting succession. To what extent should future investigations incorporate environmental conditions with basic contextual factors such as labor intensity? As corporations become more reliant on capital, to what extent do the sources of capital and those supplying raw materials become more important in determining the fate of the system's head?

As expected, ownership volatility was important, as if a change in the dominant coalition often yielded succession. One could propose that the strategic domain issue (divestiture and merger) is of more critical concern to the dominant coalitions than product-market issues and that the dominant coalitions become so upset with a record of poor profits that they change the "central power" figure. Further, it is possible to envision dominant coalitions seeking the replacement of CEOs who failed to buffer the organization against supplier volatility. Why supplier volatility is more important than volatility by other task environment units is a problem. Perhaps the task environment and strategy factors associated with succession are the ones considered particularly important by dominant coalitions that are affiliated with large U.S. industrial firms. Could the finding that not all task environment alterations were associated with succession merely reflect the concern of the dominant coalition with a few key issues that go beyond the simple economic concerns CEOs are expected to handle? Unfortunately there is a fly in this ointment. Socioeconomic volatility also was associated with succession. A considerable reinterpretation of a power-political view would be needed to incorporate this finding.

A number of issues have been raised that suggest fruitful areas for future succession research. Specifically, casting a broader net of performance and environmental explorations is likely to yield better predictions of the specific kinds of factors associated with succession. This study has added refinement to the global statements that CEOs must be concerned with performance and the environment. More precise statements about which aspects are important have emerged. Yet there still is unexplained variance. Perhaps some unexplained variance can be detected by examining whether the replacement was internal or external. A comprehensive theory might suggest that the factors examined here are more predictive of external changes, and other factors are more relevant for internal replacements.

In any case, this approach to the analysis of succession opens up new data sources and methods in the examination of organizational phenomena in general and succession in particular. Obviously, these results and their interpretation are limited by the lack of a theory of succession. This study has been conservative in data analysis and has not examined the multitude of possible interactions. The unique character of the data, the use of *Fortune* accounts, and the application of a comparatively new methodology all call for caution. But the paper does highlight the need for a theory of succession, provides some data for its development, and challenges researchers to use a variety of methodologies.

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EXECUTIVE APOLOGIES FOR PRICE FIXING: ROLE BIASED PERCEPTIONS OF CAUSALITY[1]

JEFFREY SONNENFELD
Harvard Business School

Executive role bias may be a subtle but pervasive influence on the belief systems that emerge in complex organizations. The evidence from this exploratory field study demonstrates how discrepant but systematic executive perceptions blur the clarity of organizational learning.

Several leading authors (Weick, 1969; Child, 1972; Miles, 1980) have argued for amendments to the deterministic view of organization-environment relations. For instance, they argue that an organization responds not to an objective environment per se, but to a perceived or "enacted" one. This enacted environment, however, is not a uniform perception throughout the organization. In fact, Cyert and March (1963) argue that because the organization behaves as a coalition of subunits, organizational learning may be viewed as the aggregation of subunit interpretations of environmental interactions. These subunits have divergent goals that cause the organization to hold inconsistent objectives and inconsistent environmental expectations. Lawrence and Lorsch (1967) have reported that structural configuration affects the language, the time frame, and the environmental perspective of company personnel. Thus organizational role bias may precede the enactment process. In this case, subunit self-interest may be the source of the bias.

Dearborn and Simon (1958) used functional role bias to indicate another source of perceptual bias. They explained their reported functional bias as the result of dissonance reduction. Dissonance reduction is based on the principle of cognitive consistency and refers to the tendency of people to construe new environmental events in a fashion that supports prior understandings (Festinger, 1957). Marketing, accounting, and production executives, for example, would then be likely to hold different interpretations about external events due to their different prior expectations. These expectations may be a consequence of different control systems, career experiences, or operating concerns.

The application of such explanations of apparent role bias, however, is limited by artifacts of the research setting. Dearborn and Simon removed executives from their jobs and put them in the classroom to consider a hypothetical managerial setting. Under such performance conditions members may fall back to rely on well understood referents like their functional

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specialty (Kelley, 1952). The possibility of having to make an oral defense of their written analysis would also have inspired group solidarity. Finally, the reliance on a single company for study participants may have further signaled executives that they were expected to act as functional unit representatives.

This article reports on a test of Dearborn and Simon's inferences undertaken in a field setting involving a major contemporary environmental event affecting a particular industry. Executives in four companies were asked to explain their firms' involvement in a recent price fixing conspiracy. The role bias examined was the difference in perceptions between senior level (corporate) executives and divisional executives formed six months after conspiracy convictions had been made and court sentencing had been handed down.

Such a hierarchical role bias might follow from either the subunit self-interest (avoidance of culpability) or the dissonance reduction (selective perception of causal factors) influences previously mentioned. In addition, however, the divisional executives and corporate executives may have discrepant interpretations of events in the external environment through their different vantages on and knowledge about these events. The theory of causal attribution suggests that spurious inferences of causality in observed covariation among seemingly unrelated events may follow from the information available to an individual (Kelley, 1972).

Jones and Nisbett (1971) suggested that this systematic perceptual discrepancy occurs between the uninvolved observers of events and the actors or participants in these events. Jones and Nisbett described a general tendency for actors to explain their actions as a product of "situational" determinants, whereas observers tend to explain the same actions as a consequence of the actor's stable personal "dispositions." The bias is produced by the differential availability and salience of relevant information to each party. For example, the party observing an individual trip on the sidewalk will conclude that the person tripped due to clumsiness, whereas the person who tripped will tend to blame the paving of the sidewalk. The actor has the resources of thorough biographical knowledge and can recognize his or her own inconsistent behavior. The observer is better informed about the way other people respond to the same external events (Storms, 1973). Thus there is a third possible process of role bias.

These concepts of "dispositional" and "situational" attribution can be used to construct a dependent measure of executive role bias that might be produced through subunit self-interest, dissonance reduction, or information limitations. For example, the corporate group, with their greater distance from the routine pressures of the immediate market environment, would tend to take more of the observer's perspective and attribute involvement in price fixing conspiracies to dispositional factors. A *dispositional* perspective would be defined as an executive's explanation of behavioral causality that focused primarily on the people involved directly in conspiracies as the causal factor. They would see the locus of the problem as: the moral weakness of individuals, the suspect ethics of business conduct in an isolated subculture of the company, or the stupidity of the employees. The divisional executives would be closer to the immediate market environment and hence would tend toward the "actor's" perspective, blaming company complicity on external factors such as pressure from the financial community (inability to secure the capital for needed productivity improvements), market conditions (declining demand and rise of substitute products), and the peculiarities of the regulatory environment which make the particular companies ready targets of prosecution. This is the *situational* view.

Method

Executives were interviewed from 4 of the 10 largest producers in the folding carton industry. Fines, probation, or jail terms were imposed on 47 executives in the folding carton industry, and 22 companies were convicted of price fixing in what the U.S. Justice Department described as the largest price fixing conspiracy in almost 20 years. Convicted firms faced civil suits settling in the tens of millions of dollars, astronomical legal fees, and incalculable damage to organizational morale and public image. To avoid complicating effects from courtroom experiences and personal defenses, none of the convicted or indicted executives are represented in these data.

The four companies were large forest producers, each with annual revenues in the vicinity of $2 billion. The chief executive of each was prominent in the business community. All four companies also boasted extensive legal compliance programs involving antitrust booklets, ethical codes of conduct, and large group lectures.

Permission was secured from chief executives to meet with both senior corporate and operating division executives who had direct exposure to problems in the folding carton part of the business. On-site interviews were conducted with 12 senior corporate officers and 9 divisional executives. The corporate executives group was composed of three chief executive officers, two chief operating officers, one chief financial officer, and six legal officers. The heavy representation of lawyers here did not seem to add any further bias. The group of divisional executives was composed of six vice presidents and three general managers. The independent measure employed was the executive role category. The dependent variable was the executive's response to the question "Why does the company have difficulty avoiding price fixing?"

The executives responded through one hour, open-ended interviews conducted in their offices. The interview transcripts were coded as dispositional or situational by a panel of five raters working independently. These raters had no prior knowledge of the industry or of the research hypothesis of this study. The raters distinguished the responses by whether the executive identified internal company and individual weakness (dispositional) or coercive external pressures (situational) as the primary factor for his company's involvement in the conspiracy. Executive attributions of causality were classified by the median evaluation of the raters on each of the 21 interview transcripts. The inter-rater agreement on all 21 interviews ranged from .7 to 1.0. The overall inter-rater reliability was .85.

Results

Participants seemed grateful to have this opportunity to speak anonymously about their interpretation of this traumatic industry situation. Their candid responses made it possible to examine the relationship between executive role and causal attribution regarding their company's illegal price fixing activity. The resulting frequency distribution in Table 1 did not allow for a valid chi square test. Meaningful insight was obtained, however, by correlating the assigned values of 1 or 2 given to dispositional and situational causal perceptions, respectively, with the assigned value of 1 or 2 given to corporate or divisional executive role, respectively. A strong positive relationship was found between executive role and causal perception ($r = .81$, $t = 6.02$, $df = 2$, $p < .001$).

TABLE 1
Frequency Distribution of Causal Attributions About Price Fixing by Organizational Role

	Attribution of Behavioral Causality	
Organizational Role	*Dispositional*	*Situational*
Corporate Executives	11	1
Divisional Executives	1	8

Of the two deviations from predicted results, the corporate executive who reported a situational explanation spoke in the presence of a divisional executive and may have felt compelled to show some understanding of the divisional perspective. The divisional executive who deviated from the expected perspective held a corporate level title, executive vice president, but actually had divisional operating responsibilities.

Thus these two executive groups differed predictably in the way each explained their companys' involvement in a price fixing conspiracy. Corporate executives consistently identified the locus of causation for the conspiracy as the *dispositional* factors of the individuals directly involved. They viewed corporate involvement as a consequence of the uncontrollable variation in human morals, obedience, and intelligence. The widespread criminal offenses were seen as isolated incidents of human weakness tempted by the prevailing low morals in a few isolated industry subcultures. Below are some examples of the dispositional perspective taken from the interview transcripts with corporate executives:

> The individual salesman seems to think that the company message is for everyone else but them. There seem to be pretty low standards in the folding carton industry and a lot of stupid people there. Now we hear them cry, but we thought it didn't mean us. You begin to wonder about the intelligence of these people. Either they don't listen or they're just plain stupid.
>
> The guys at the core were acquired people from the newly acquired companies. That is just not the way we try to do business. Questions of ethics were never raised. We assumed that all people here do business ethically. Views on price fixing vary.
>
> The violators probably felt they'd get promoted. They don't get this motivation here in the company, though. They just figure that they won't get caught. Any salesman can do great damage to the company. When they get in trouble, you just can't believe they went out and did it. We believe this stuff may be continuing.

On the other hand, divisional executives, who were closer to the line of fire, had considerably more sympathy for situational explanations of causality. They complained of nebulous conflicting company goals in the face of declining demand and tightened antitrust enforcement. Below are some examples of the situational perspective, taken from the interviews of divisional executives:

> The need to survive conflicts with the drive to be super clean. It is impossible not to have talked price at some time. Even I've been tempted to go to porn flicks. ... In any converting industry you're going to have what we got nailed with. Dialogue on prices is always on your mind. I take the train with comparable guys in textiles, pharmaceuticals, and metal parts conversion...every order is a negotiation.
>
> Conditions here are volatile because the very big buyers can create cyclicality. The financial pressures are very strong. We are hurting for investment due to our bad earnings record. With declining demand and no new capital, price level is crucial. The drive to stay alive has led to price collusion. Here you aren't working with a stable product or a price list. We have the same paper and equipment as our competitors. We can all make the same boxes and pictures.
>
> This industry hasn't made 3 percent on sales in six years. It is highly cyclical and there is tremendous mill capacity for business which no longer exists. Price agreements between competitors were a way of life. ... We're not vicious enemies, just people in similar binds. ... I always thought of myself as a committed honorable citizen. We didn't do these things for our own behalf. It was presumably done for the betterment of the company.
>
> This whole situation was quite confusing and a lot of relatively innocent people were caught in a very loose net. This sector has been ripped off by big companies for a long time. Anything that this industry has done has been more in defense than offense.

Respondents in both groups spoke about their interpretations with high certainty and demonstrated little interest in entertaining alternative explanations.

Discussion

It has been regarded generally by executives in this industry that a painful lesson had been learned from the price fixing convictions (Sonnenfeld & Lawrence, 1978). But the results of the present study indicate that at least two conflicting belief systems emerged, depending on the executive's role. These field data extend findings of horizontal executive role bias reported by Dearborn and Simon (1958) beyond the classroom perceptions of a hypothetical business problem to a vertical executive role bias identified in a major contemporary managerial issue.

It is hard to state with assurance that the observed perceptual biases in this study were demonstrations of subunit interest in avoiding culpability, dissonance reduction through selective attention to objective information, or a demonstration of the different perspectives of "observers" and "actors" suggested by attribution theory. Regardless of the cognitive process used to create this perceptual bias, its existence was powerfully demonstrated. Senior corporate executives tended to see culpability in the actions of individual violators without regard to the market setting and other external factors. Corporate executives saw violators as criminals to be punished for their wrongdoings as a deterrence from other such temptation. They look to tools such as employee selection surveillance, rewards tightening, and policy clarification to help improve legal compliance.

The divisional executives felt that a miscarriage of justice may have taken place. They believed that many conscientious people were unfairly hurt because they happened to be the ones who were caught. Rather than an example of unethical conduct, the convictions, to this group, represented the difficult business conditions and lack of political clout in the forest products industry. Divisional and corporate executives looked to very different solutions. Rather than tightening company disciplinary policies and formal controls, the divisional executives felt that the companies needed to make changes in their business strategy to gain more control over the market, and hence be less susceptible to external pressures.

It is important to recognize these divergent perspectives in order to understand how to be successful in managing environmental interactions. For example, resentment of further discipline may build, and divisional executives may feel justified in devising means of avoiding detection rather than eliminating price fixing activity. The problem most closely felt by divisional executives was the punishment, not the offense. Each group of executives lacked the secondary feedback that would challenge their existing notions of the companys' interactions with the external social environment. Argyris and Schon (1978) have labeled such a situation a failure in "double-loop learning," which results in the maintenance of underlying theories-in-use despite espoused learning.

This learning involves a preparedness for learning in advance of crisis response. Companies need to take an initial step of exploring the environmental perceptions of key personnel before designing policies based on a strictly corporate-based definition of the problematic issue. To improve such two way understanding, some companies have successfully used small group legal discussions, compliance ombudsmen, training films showing sensitivity to the perspectives of the individual salesman, and mock courtroom interrogations. Companies cannot learn about the environment by mere thermostatic-like adjustments but must continually question the setting of the dial as well. The integration of conflicting environmental perceptions can provide such a challenge to narrow executive constructs of reality. Future research could greatly contribute to this area by investigating the issues that block effective integration of environmental perceptions. An effective sensory system depends on the synthesis of input from diverse environmental receptors.

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SUPERIORS' AND SUBORDINATES' PERCEPTIONS OF PERFORMANCE: BEYOND DISAGREEMENT

LINDA SMIRCICH
The Pennsylvania State University
R. J. CHESSER
Syracuse University

An awareness that has emerged from organizational behavior research is that superiors' and subordinates' perceptions can differ significantly. One issue on which these differences has been marked is the level of subordinate job performance (Baird, 1977; Henemann, 1974; Thornton, 1968). The implications of these differences can be viewed as dysfunctional by both managers and researchers alike. To managers such differences may signal ineffective or incomplete communications with subsequent dissatisfaction with the appraisal and reward processes. To researchers the growing awareness of perceptual differences presents a challenge to the abundant research based on perceptual data, for such research implicitly assumes that people perceive the questions on survey instruments in the same way.

How one reacts to the findings of differences in perception is a function of one's view of the nature of social reality (Burrell & Morgan, 1979). Those who subscribe to an ontology of realism would say that differences in reported perception are due to individual distortions of the unique, objective, and "true" reality. And, therefore, their strategy for studying perceptual differences would be to use psychometric techniques to isolate sources of variation from true scores. The concern of the realist would be to evaluate the accuracy of perception by determining the deviations from the "true" score. Cronbach (1955) gives an example of this approach. Those who subscribe to a nominalist view hold that social reality is subjective and highly individualized. Perceptual congruence is possible under a nominalist view, but it arises not from the existence of perceptual accuracy but as a result of the arriving at a shared definition of a subjective reality. In dealing with perceptual differences the strategy of the nominalist would be a phenomenological one. The concern of the nominalist would be to explore more fully the various dimensions of interpersonal perception. For example, most studies of perceptual agreement simply indicate whether or not the parties share a common reality. They say nothing about the degree to which the parties are aware of one another's reality or if the parties attach any personal significance to the differences. This research follows the nominalist tradition by seeking to widen the scope of inquiry into interpersonal perception to include more dimensions.

Prior research on perceptions of performance has focused primarily on determining whether there is agreement or disagreement between superiors and subordinates. Laing, Phillipson, and Lee (1966) suggest that such a limited analysis is not sufficient for understanding the complexity of interpersonal perception. They introduce the notion of a spiral of reciprocal perspectives. Direct perspectives are person X's views on issue Z; metaperspectives are person X's views of person Y's views on issue Z; meta-metaperspectives are person X's views of person Y's views of person X's views on issue Z; and so on. Further, Laing et al. present the following hierarchical framework of the conjunction between the interpersonal perspectives.

> 1. Comparison between one person's direct perspective and the other person's direct perspective on the same issue indicates agreement or disagreement.
> 2. Comparison between one person's metaperspective and the other person's direct perspective on the same issue indicates understanding or misunderstanding.
> 3. Comparison between one person's meta-metaperspective and his own direct perspective indicates the feeling of being understood or being misunderstood.
> 4. Comparison between one person's meta-metaperspective and the other person's metaperspective on the same issue indicates realization or failure of realization. (Realization refers to being correct or incorrect in feeling understood or misunderstood.) (1966, p. 80).

The thrust of the research on perceptual differences between superiors and subordinates has been at the first level. The research reported here focuses on level two. By comparing subordinates' metaperspectives on performance with superiors' direct perspectives on subordinates' performance, the issues of understanding or misunderstanding were explored. This was done by asking a number of subordinates to judge how their superior would evaluate their performance (metaperspective) and comparing the results with the superior's evaluation of the performance (direct perspective).

A second issue investigated was the possibility that understanding or misunderstanding would be moderated by the nature of the relationship between superiors and subordinates. There is some evidence that agreement is a function of the quality of the exchange between leaders and members (Graen & Schiemann, 1978). The specific moderating variable explored was the degree of authenticity in the superior-subordinate relationship. This was suggested by Bugental's (1967) observation that high reality perception is closely associated with authenticity in relating. As operationalized here, an authentic relationship, with its openness, empathy, supportiveness, and effective communication, should promote the mutuality of perspectives.

Method

Subjects—The subjects in the study were 141 employees of two organizations, one a large regional corporation that distributes a large and varied line of services and products including insurance, gardening materials, petroleum, and farm supplies. The other was a national manufacturer of pharmaceuticals. Of the 141 subjects, 83 were addressed in a subordinate role, and 58 were in a superior role. The reason for fewer superiors was that some of the subordinates were from the same work group and had the same immediate superior.

Instruments—Perceptions of performance were assessed along six dimensions: quality of work, quantity of work, dependability, ability to get along with others, initiative on the job, and overall performance (Sims & Szilagyi, 1975). Each superior rated the performance of his subordinates participating in the study (direct perspectives). The subordinates completed a modified version of the rating scale, which asked them to rate their performance, not the way they perceived it, but, instead, the way they believed their superior would rate them (metaperspective). The internal consistency of the performance scale completed by the subordinates was .80, and that for the version completed by the superiors was .87.

Authenticity was assessed by a 20-item instrument based on discussions of the concept from diverse sources: existentialism, sociology, psychotherapy, and social psychology. Although a full development of the instrument is beyond the scope of this paper, the basis of the construct is presented. See Smircich and Chesser (1979) for the full psychometric development.

Although the various discussions of authenticity are somewhat different depending on the source, there does seem to be an underlying commonality that represents the core of the concept. Authentic relationships seem to be those characterized by openness and empathy; the individuals are seen by one another as individuals in their own right, not as objects or stereotypes; the individuals do not hide behind facades, and they are able to present their perceptions, feelings, and behaviors as one.

The following comments express these aspects of authentic interaction within the context of the superior-subordinate relationship. They come from the interviews conducted as part of this research.

> With my superior you don't have to worry about being shot down.
>
> You know where she stands, she has authority, but doesn't act like a drill sergeant. You don't mind coming in early to work for her.
>
> Our relationships is mutually helpful, a two-way street on information exchange, he gives a lot of support, he's conscious of what we have to say.
>
> I respect hims as a supervisor, but I don't feel like he's above us. He makes us feel comfortable.
>
> He never makes us feel like he is *the* foreman.

In an authentic relationship both parties listen to one another can can display a sense of caring and empathy for the other. Each one tries to "step into the other's shoes" to know how the other feels. Along with this goes the feeling of give and take in the relationship. Each person feels that he can influence the other. Overall, the relationship is perceived as a source of support rather than of threat or isolation.

In low authenticity relationships the subordinate feels that the superior "controls" the situation. The superior has the upper hand, and the subordinates feel as though they have little influence. The subordinates feel that the superiors do things without their knowledge, behind their backs. The subordinates feel a sense of nonsupportiveness or isolation. The superior appears to remain aloof and removed from interaction. There is a reluctance to express throughs or feelings. Again, from the interview data:

> I don't think my boss knows we exist. She doesn't seem to care. She keeps us beneath her. We are lowly workers, she's a supervisor.
>
> He's still the boss, while you're talking with him you know he's still looking at his watch to see how much time you're wasting.
>
> You don't know what's on the supervisor's mind. If I do something wrong, the supervisor discusses it with everyone but me, puts me on the spont, everyone else would know more about it than me. I would like things to be open, everyone would say exactly what was on their mind—to the parties involved.
>
> My superior doesn't really listen. I'm on edge to go to him with a company problem. He makes us feel stupid when he talks to us—he puts us down—you feel like a fool.

The descriptions of high and low authenticity show that they represent qualitatively different kinds of relationships between subordinates and superiors.

The 20 items of the authenticity scale along with their derivative fields are presented in Table 1. The subordinates were asked to rate each item as to whether it is "very strongly uncharacteristic" (1 point) through "very strongly characteristic" (7 points) of the relationship they have with their superior.

TABLE 1
Authenticity Scale

Discussion of Authenticity	*Sample Questionnaire Items*
Existential:	
I-Thou is a relationship of openness, directness, mutuality and presence.	20. My relationship with my superior is open and direct.
Authentic...because it is characterized by a wholeness and integration of self; perceptions, feelings, behaviors are presented as one.	11. When I talk with my superior my words match my feelings.
	14. My superior says one thing and does another (reversed item).
	6. In my relationship with my superior I can act in accord with my own values.
	15. With me, my superior is honestly himself/herself.
Sociological:	
Authenticity comes out of a blending of individuality and social status.	2. My superior shows flexibility in carrying out the role of supervisor.
Authentic behavior reflects valid, unstereotyped self-knowledge.	3. I can tell my superior really knows himself/herself.
Seeing one another not as stereotypes.	1. My superior treats me as a whole person, not an object.
Psychotherapeutic:	
Authenticity means dropping pretense, defenses, and duplicity.	10. In my relationship with my superior there is no gameplaying.
It means an end to "playing it cool."	7. With my superior I am honestly myself.
	9. With my superior, I "play it cool" (reversed item).
	17. With my superior I don't put up a facade or false front.
Empathy, mutuality.	19. My superior could step into my shoes and really know how I feel.
	8. When I talk with my superior I am wary and cautious (reversed item).
	13. My superior is open with me.
Social-psychological:	
Giving and receiving nonevaluative descriptive feedback.	16. My superior is aware of my weaknesses and accepts them as a part of me.
Increase awareness of self and others and acceptance of self and others.	4. With my superior I can really say what I feel.
Owning and helping others to own to their values, attitudes, ideas.	5. My superior encourages me to be open in our relationship.
	12. When we talk I know that my superior really listens to me.
	18. My superior shares with me the positive feelings that our relationship produces.

The scale has encouraging psychometric properties. Its internal consistency was .93. Convergent validity was investigated by interviewing the subordinates about the nature of the relationship they had with the superior. Two judges read the interview data and assessed the degree of authenticity in the relationship. The intra-class correlation between judges was .78 and the correlation between the average rating of the judges and the authenticity scale was .83, giving strong support for convergent validity.

Analysis

In addition to simple correlations, the degree of shared perceptions was tested using the Wilcoxon matched-pairs signed-ranks test (Siegel, 1956).

This test is applicable in the case of two related samples when the experimenter wishes to establish whether two conditions are different and also the magnitude of the difference. It can be used on data for which the researcher "can (a) tell which member of a pair is 'greater than which,' i.e., tell the sign of the difference between any pair, and (b) rank the differences in order of absolute size" (Siegel, 1956, p. 75). The test gives more weight to a pair that shows a small difference.

To test the moderating effects of authenticity, the subjects were divided into three groups according to their authenticity score. The high authentic group ($N=26$) had scores of 124 or greater, the medium groups ($N=27$) had scores between 108 and 124, and the low group ($N=28$) had scores below 108.

Results

For the total group, the correlation between the superiors' ratings of performance and the subordinates' rating of the superiors' evaluations was .04, clearly indicating misunderstanding.

Authenticity does not appear to be a moderating variable in this case. The Wilcoxon test (Table 2) shows that for the entire group and each authenticity group, subordinates perceive that their superior would rate their performance higher than they actually did. Only in the medium authenticity group were the results statistically nonsignificant ($p \leq .05$).

Discussion and Conclusions

Research has shown that superiors and subordinates disagree on the issue of subordinate job performance. The present research indicates that for the subjects investigated, subordinates also do not understand their superiors' perspectives. In many ways this seems more critical. Disagreement accompanied by understanding may contribute to a more productive relationship with the possibility of change. However, misunderstanding not only is a fundamental obstacle to future communication but it hinders the likelihood of change.

TABLE 2

Wilcoxon Test for Perceptions of Performance

	−Ranks[a]	*+Ranks*	*Z*	*p (one-tailed)*
Total sample ($N=83$)[b]	44	31	−2.915	.002
High authenticity ($N=26$)	15	9	−2.100	.018
Medium authenticity ($N=27$)	13	10	−1.247	.110
Low authenticity ($N=30$)	16	12	−1.731	.040

[a] If there are more negative ranks than positive ranks, the subordinates' scores were higher.

[b] Overall N is 83, but only 75 cases received ranks because 8 superior-subordinate pairs had matching scores.

The lack of understanding between subordinates and superiors may account for some of the inconclusiveness in research in such areas as motivation, leadership, and performance appraisal. This seems particularly true concerning the association between performance and rewards.

Apparently the issue of performance evaluation is one that is readily subject to misunderstanding. Authentic interaction would appear to promote understanding; however, regardless of the degree of authenticity, subordinates believed that their superiors would rate their performance higher than they actually did. Although this finding was not anticipated, there are a number of factors both contextual and methodological that could have obscured the possible moderating effects of authenticity. One factor is the authenticity instrument itself. It has been noted that the authenticity scale has promising psychometric properties, but issues of scale reliability and validity must always be raised, particularly with new measures. It also is possible that the degree of authenticity in the relationships investigated was not sufficiently high to precipitate the hypothesized moderating effects. A third methodological factor could be undetected interaction effects with uncontrolled variables such as leadership style, previous performance-reward contingencies, and equity assessments.

Another factor that may account for the lack of moderating effects of authenticity was the context for the assessment of understanding, that is, the subordinate's own job performance. The evaluation of performance can be a difficult situation for both employees and their superiors and may represent a situation in which it is extremely difficult to be authentic. The superiors may be hesitant to delve fully into those aspects of performance in which they believe the subordinates need improvement. On the other hand, the superiors may deal completely with all aspects of performance but the subordinates may focus only on the positive. Subordinates may also generalize their affective orientation toward their superiors to their predictions of performance ratings. Considering these possibilities, it may be useful in future research to explore the issue of authenticity moderating understanding within other organizational contexts, such as joint goal setting, in which there may be less ego involvement.

The point has been made here that research must go beyond the level of agreement in order to explore fully the perceptions resulting from interaction between superiors and subordinates. Also, research must go beyond the level of understanding to include all four levels of the Laing et al. (1966) framework. This would add to the analysis the feelings of being understood or misunderstood and the realization of the correctness or incorrectness of such feelings. Laing et al. emphasize that "only the total spiral derived from the matching of (the perceptions of) both individuals gives us a profile of the dyad as a system at any point in time" (1966, p. 85). This is a viewpoint that seems especially relevant to research in the area of leadership, in which with few exceptions (Graen & Schiemann, 1978; Dansereau, Graen, & Haga, 1975) leadership has been treated as an attribute of a person rather than a process occurring within the context of a dyadic relationship. The four-level framework provides a mechanism for fuller examination and comparison of perceptions rather than "one person's set of attributions considered in isolation" (Laing et al., p. 59). Such an approach may offer greater insight into the dynamics of interpersonal relationships in organizations.

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DIMENSIONALITY OF THE JOB DESCRIPTIVE INDEX[1]

SAMUEL J. YEAGER
Wichita State University

The Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969) is the most widely used measure of job satisfaction extant today. More than 50 percent of the articles published between 1970 and 1978 in seven leading management or management related journals that used non-ad hoc measures of job satisfaction employed the JDI. The journals examined were *The Academy of Management Journal, Administrative Science Quarterly, Human Relations, Journal of Applied Behavior Science, Journal of Applied Psychology, Organizational Behavior and Human Performance*, and *Personnel Psychology*. In addition, more than 50 percent of the studies using non-ad hoc measures of job satisfaction in *The Proceedings of the Academy of Management* since 1975 have employed the JDI. Earlier issues do not include enough detail on the papers presented to classify. Ad hoc measures are unique or used in only one study.

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[1] The author expresses thanks to Patricia Cain Smith, Bowling Green State University, for supplying copies of the factor matrices used in Smith, Smith, and Rolls (1974) and also for the coding scheme used.

One reason for the JDI's wide use is the care with which it was developed. Its development is described in detail in Smith et al. (1969) and in a recent paper by Smith and Sandman (1979). Another reason is its applicability across a wide variety of demographic groups (Golembiewski & Yeager, 1978).

The 72-item instrument was designed to measure 5 theoretically and practically useful dimensions of job satisfaction—satisfaction with the work itself, supervision, co-workers, promotion opportunities, and pay. However, a recent study has questioned this five-dimensional structure. Smith et al. (1974) report seven rather than five dimensions because a scree test (Cattell, 1966) indicated that there were seven non-trivial factors in their data. These factors are discussed later in this paper. Smith et al. (1974) did not focus on the dimensionality of the JDI, nor did they examine the utility of more than five factors. The present study examines the dimensionality of the JDI, the utility of a larger number of factors, and their implications.

Smith et al. (1974) reported results from analysis of 3 different samples containing 212 white and 107 black government employees, and 110 white bank employees, respectively. The supervision items split into performance and interpersonal dimensions in all three of their samples. The work scale split into two dimensions in only one (white civil servants) of their samples. The items for co-workers, pay, and promotion opportunities loaded consistently on the a priori factors. Given the results of Smith et al., a similar split of the supervision items was expected in the present study. Because the co-worker items specifically refer either to peer performance on the job or to interpersonal relations with peers, it was expected that they might form two factors. This would parallel the split along similar lines reported for supervisory items by Smith et al. (1974). The pay and promotion items were expected to load entirely on the a priori factors for several reasons. First, these factors remained intact in all three samples in Smith et al.'s study. Examination of these items further reinforces this expectation. Divisions or subtopics are not clearly apparent as they are among the supervision and co-worker items. Third, there are fewer items in these scales, 9 instead of 18, and this lessens the likelihood, given the comparative homogeneity of items, of a split occurring. Expectations about the pattern of the factor loadings for the work itself items were more problematic given Smith et al.'s mixed results and their small sample sizes. The items in the scale split in only one of their three samples. This could be an artifact unique to that sample. Its small size increases the likelihood that the sample is unique in some way that would cause unique results.

Differences in results between the Smith et al. (1974) study and the present study also are expected for several methodological reasons. The characteristics of the subjects in the sample used in this study are different from their three samples. For example, the type of work they perform and the communities they work in are different. As a result, there is variation in each sample that is unique to it, which can influence factor analytic results. Second, when the number of cases is small relative to the number of variables dominant, strong factors may mask weaker ones. This may have been a problem for Smith et al. because their samples contained 212, 110, and 107 cases. Only one of these provides the minimal 3-to-1 cases-to-items ratio generally believed necessary for factor analysis, much less the more desirable and often recommended ideal of a 10-to-1 cases-to-items ratio (Gorsuch, 1974). This problem does not confound the present study because the cases-to-variables ratio is better than 30 to 1.

Method

Data were gathered as part of a quality of working life study in a large U.S.-based soft-goods company. Approximately 2,700, or 75 percent of the company's work force voluntarily returned questionnaires. Listwise deletion of missing data reduced the useful number of cases to 2,261. As shown in Table 1, the employees in this sample range from the top of the corporate hierarchy to the janitorial level. Formal education ranges from none through the doctoral level. In addition, nearly 41 percent of the respondents are women, and over 13 percent are minority group members.

TABLE 1
Rank and Education of Respondents[a]

	N	*Percent*
Rank		
1st aggregate (lowest rank)	489	20.1
2nd	493	20.3
3rd	215	8.8
4th	656	27.0
5th	346	14.2
6th aggregate (highest rank)	231	9.5
Education		
0–high school	982	37.3
Vocational–junior college	597	22.6
College (4 years)	501	19.0
College (more than 4 years)	553	21.0

[a] Numbers do not total 2,671 because of missing data. The percentages are adjusted to eliminate the effects of missing data. Percentages may not total 100 because of rounding errors.

The analytic techniques employed here are essentially the same as those used by Smith et al. Items are coded as follows: Y is = 3, "?" = 2, NO = 1, and reversed items are recoded prior to factor analysis. The items needing recoding are identified in Smith et al. (1969). A principal components analysis was performed. This was followed by a scree test of the eigenvalues (Cattell, 1966) to determine the number of non-trivial factors or the number of factors to rotate. A scree test was used because it usually is a more conservative determinant of the number of non-trivial factors than the eigenvalue greater than or equal to 1.0 criterion. Here, for instance, there were 14 factors with eigenvalues greater than 1.0, and the scree test indicated 9 non-trivial factors. Finally, the non-trivial factors were subjected to a varimax rotation to an orthogonal terminal solution. In addition to these analyses, Bartlett's (1950) test for significance in the correlation matrix was performed prior to factor analysis of the data.

TABLE 2
JDI Factor Loadings[a]

Items	*Factors*								
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
Work									
Fascinating	06	-04	57	21	-06	-06	18	02	-20
Routine	04	14	72	08	04	09	00	-03	07
Satisfying	10	04	51	14	05	09	12	-09	-52
Boring	09	18	58	09	04	24	02	-03	-26
Good	11	11	29	01	08	10	07	-07	-58
Creative	08	05	66	14	00	10	14	-03	-23
Respected	20	08	21	18	11	06	11	-11	-47
Hot	01	09	-14	00	08	37	-01	-08	00
Pleasant	14	10	15	07	09	31	15	-17	-48
Useful	11	12	19	05	14	-05	-05	-02	-45
Tiresome	07	15	41	02	08	53	04	-03	-07
Healthful	05	-01	08	14	-02	16	15	-10	-40
Challenging	11	05	70	13	04	-10	11	00	-31
On your feet	00	10	06	-01	24	20	03	-09	40
Frustrating	03	12	-07	11	-01	62	00	-10	-09
Simple	08	15	68	00	07	-05	01	02	01
Endless	05	07	06	03	03	63	-01	-07	02
Gives sense of accomplishment	09	07	54	09	03	05	11	-03	-53
Supervision									
Asks my advice	27	08	34	09	12	-20	06	-30	-03
Hard to please	09	06	-02	10	12	18	00	-69	-07
Impolite	37	09	05	07	07	05	-04	-63	-03
Praises good work	44	00	04	16	03	-02	09	-34	-12
Tactful	43	01	07	13	03	02	08	-55	-07
Influential	43	01	17	28	05	-03	14	00	-12
Up-to-date	66	06	03	11	09	-01	12	-12	-09
Doesn't supervise enough	47	16	14	04	13	08	05	00	03
Quick-tempered	14	06	02	07	04	11	01	-70	-02
Tells me where I stand	53	04	03	15	05	-08	05	-09	-15
Annoying	39	12	02	10	03	12	-02	-63	-05
Stubborn	14	05	-02	14	04	15	05	-72	02
Knows his/her job well	73	02	02	08	08	07	12	09	07
Bad	55	15	00	09	08	07	-05	-38	-02
Intelligent	64	04	10	04	08	-05	15	-17	-04
Leaves me on my own	01	04	06	-01	09	-17	13	-42	-13
Lazy	56	13	06	06	04	10	-05	-15	00
Around when needed	59	10	05	06	02	06	05	-13	-10

[a] Decimal points are omitted to simplify presentation.

TABLE 2 (cont.)
JDI Factor Loadings[a]

Items	*Factors*								
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
Co-workers									
Stimulating	05	22	30	13	01	–03	55	–07	-10
Boring	–01	62	12	07	03	09	21	–06	–03
Slow	06	55	02	06	05	14	39	–04	11
Ambitious	05	15	14	11	06	–01	64	–02	–06
Stupid	09	68	04	03	08	02	08	–01	03
Responsible	17	44	02	04	05	–01	52	–02	–03
Fast	06	15	–08	07	05	09	67	–03	–04
Intelligent	21	37	13	02	09	–08	56	–05	–05
Easy to make enemies	04	66	03	07	07	03	11	–09	–07
Talk too much	14	57	03	06	01	11	14	00	–02
Smart	17	35	14	00	09	-11	54	–02	04
Lazy	11	66	07	07	05	08	25	00	06
Unpleasant	05	74	08	01	08	–01	–01	–07	–09
No privacy	11	46	12	10	–01	11	05	–06	-13
Active	10	34	06	05	02	02	62	–02	-10
Narrow interests	02	48	13	10	06	07	35	–09	–01
Loyal	10	39	01	07	07	05	42	–05	-18
Hard to meet	01	59	00	03	03	00	12	–07	–08
Promotion									
Good chance for advancement	08	05	03	84	03	00	03	–07	-15
Opportunity somewhat limited	07	03	07	69	00	01	07	–07	00
Promotion on ability	22	09	04	64	13	01	09	–02	-13
Dead-end job	15	13	20	65	08	03	03	–05	-17
Good chance for promotion	09	07	07	84	02	00	04	–06	-15
Unfair promotion policy	25	16	09	52	24	10	08	–06	–09
Infrequent promotions	04	03	10	66	16	08	07	-11	12
Regular promotions	06	03	06	69	13	02	06	–09	06
Fairly good chance for promotion	08	08	05	80	08	01	00	–09	-12
Pay									
Income inadequate for normal expenses	–07	-11	-12	00	64	07	04	04	02
Satisfactory retirement plan	06	07	-15	17	30	09	04	03	-13
Barely live on income	06	15	14	01	69	–06	–06	–06	–04
Bad	10	24	08	06	60	–07	-10	–08	-16
Income provides luxuries	02	–09	14	08	54	–01	20	–03	04
Insecure	09	18	–05	11	43	–03	–02	-10	-33
Less than I deserve	10	–01	–08	17	64	17	09	–04	01
Highly paid	01	-11	02	11	57	09	19	–04	07
Underpaid	11	05	–09	13	71	13	05	–05	00
% of Variance Explained	*17.23*	*6.44*	*5.39*	*4.69*	*3.80*	*2.97*	*2.20*	*2.12*	*1.97*

[a] Decimal points are omitted to simplify presentation.

Results

The scree test, or plot of eigenvalues against factor numbers, indicated that there were nine non-trivial factors in this data, not five corresponding to the original scales, or seven, as in Smith et al. (A plot of the eigenvalues and a discussion of their interpretation is available from the author.) Orthogonally rotated factor loadings are reported in Table 2. The nine factors are here called ability of the supervisor to do his/her job, co-workers' interpersonal relations, challenging work, promotion opportunities, pay, frustration with work, ability of co-workers to do their jobs, interpersonal relations with the supervisor, and fulfillment in work. As expected, both the supervisor and co-worker items load on parallel factors referencing interpersonal relations and performance/ability to do their job. Some of the factors resulting from the split scales are difficult to interpret, particularly those resulting from the 18 work itself items. Other researchers may wish to rename some of these scales. The promotion and pay factors remained relatively intact, as expected. Only one item failed to load significantly (greater than .40) on the pay dimension.

Scales were created by summing the items that loaded on each of the factors. However, items with less than .4 loadings or that loaded on more than one factor were deleted. As a result, three of the work, two of the supervision, one of the co-worker, and one of the pay items are deleted. Cronbach alphas for both the original JDI scales and the new scales are reported in Table 3. The internal consistency of seven of the nine new scales is reasonably high. The high reliabilities for the majority of the new as well as of the old scales are encouraging. The high reliabilities indicate that statistically the items within a scale seem to be measuring the same thing. Two of the new scales have comparatively low reliability. This means that they are not very useful, and further study of the JDI's dimensionality and resulting scales is needed.

Correlations between the alternative scales and the corresponding JDI scales, shown in Table 4, are of moderate-to-large size because they contain common items. This characteristic obviously increases in size with the number of common items. In contrast, intercorrelations between the new scales are generally of reasonably small size. Only the two co-worker and two supervision scales correlate at or near the .5 level. This is reasonable given their common referents. The rest are much smaller. They are similar to those between the original five JDI scales. Only two of the other correlations are larger than the mean (.344) intercorrelation between the original JDI scales.

TABLE 3
Scale Characteristics

	Number of Items	*Alpha Coefficients*	*Range*	*Mean*	*Standard Deviation*
Alternative scales					
Supervisor's ability	10	.81	10-30	13.82	3.98
Co-worker interpersonal relations	10	.84	10-30	15.10	3.50
Challenging work	6	.81	6-18	9.97	3.57
Promotion opportunities	9	.90	9-27	18.78	5.59
Pay	8	.78	8-24	13.16	3.81
Work frustration	3	.52	3- 9	5.81	1.91
Co-workers' ability	7	.80	7-21	10.48	3.21
Supervisor interpersonal relations	6	.79	6-18	8.35	2.97
Fulfillment in work	6	.45	6-18	9.31	2.05
Original scales					
Work itself	18	.80	18-54	29.44	6.56
Supervision	18	.87	18-54	25.38	6.99
Co-workers	18	.89	18-54	26.82	6.25
Promotion opportunities	9	.90	9-27	18.78	5.59
Pay	9	.77	9-27	14.89	4.09

TABLE 4
Intercorrelations Between Scales[a]

		9 Alternative Scales								5 Original Scales				
		A2	*A3*	*A4*	*A5*	*A6*	*A7*	*A8*	*A9*	*J1*	*J2*	*J3*	*J4*	*J5*
Supervisor's ability	/A1	27	28	38	28	18	33	50	37	38	89	35	38	29
Co-workers' interpersonal relations	/A2	—	27	23	20	25	56	21	31	37	29	88	23	21
Challenging work	/A3		—	30	15	20	33	12	40	84	27	34	30	14
Promotion opportunities	/A4			—	30	18	27	28	33	37	40	28	1.00	24
Pay	/A5				—	14	21	23	30	25	30	23	30	98
Work frustration	/A6					—	15	24	33	56	23	23	18	14
Co-workers' ability	/A7						—	18	33	39	31	88	27	22
Supervisor interpersonal relations	/A8							—	31	28	81	22	28	24
Fulfillment in work	/A9								—	73	41	36	33	30
Work itself	/J1									—	40	43	37	25
Supervision	/J2										—	34	40	31
Co-workers	/J3											—	28	24
Promotion opportunities	/J4												—	32
Pay	/J5													—

[a] Correlations between new scales derived from a common original JDI scale are underlined. Correlations between the new scales and the one from which they were derived also are underlined.

It seems clear that the JDI contains more than five dimensions. The results reported here indicate that the pay and promotion opportunity dimensions remain relatively intact, just as they did in Smith et al.'s study. This research confirms the ability/performance and interpersonal relations split in the supervisory items reported by Smith et al. and extends it to the co-worker scale. Their study suggests, and this one confirms, that there may be some difficulty with the items in the work itself dimension. For them, it split into two factors that were not easily interpretable. Here it split into three factors that were not much more interpretable than theirs.

The reasonably high reliabilities and low interscale correlations suggest that the alternative scales may be useful for organizational research. This seems especially so for the ability/performance and interpersonal relations scales for the supervision and co-workers. Given their psychometric properties, they also are useful because they are more specific scales than the original ones. In addition, the two supervisory scales for job performance/ability and interpersonal relations loosely parallel two of the major dimensions of leadership identified in the Ohio State Leadership Studies (Stogdill, 1974) and in Blake and Mouton's (1964) Grid Theory—production and interpersonal orientations. This parallelism should be investigated in future research. The usefulness of all three of the alternative scales based on the work items is not so clear. As a result, further research needs to be conducted about the dimensionality of the JDI. Moreover, this instrument and all others are subject to variations unique to different samples. Consequently, confirmatory factor analysis should be performed and reliability coefficients computed prior to use of the JDI or other measures.

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NOTES ABOUT AUTHORS

Joseph A. Alutto is Dean and Professor of Organizations, School of Management, State University of New York at Buffalo. He received a Ph.D. in Organizational Behavior from Cornell in 1968, an M.A. from University of Illinois in 1965, and a B.B.A. from Manhattan College in 1962. He has published numerous articles in the *Academy of Management Journal, Administrative Science Quarterly, Journal of Applied Psychology, Social Forces, Industrial and Labor Relations Review*, and other professional journals. His current research activity has focused on commitment phenomena in organizations and assessments of the impacts of structural, role, and individual factors on system, subunit, and individual performance.

Hugh J. Arnold is an Assistant Professor of Organizational Behavior in the Faculty of Management Studies at the University of Toronto (Faculty of Management Studies, University of Toronto, 246 Bloor St. West, Toronto, Ontario, Canada M5S 1V4). He holds degrees in Psychology from the University of Alberta and Oxford University and obtained his M.A. and Ph.D. in Organizational Behavior at Yale University. His publications have appeared in *Organizational Behavior and Human Performance* and the *Journal of Applied Psychology*. He currently is involved in research in the areas of motivation, decision making, and statistical methods.

William J. Bigoness is an Assistant Professor of Business Administration in the Graduate School of Business Administration, University of North Carolina at Chapel Hill (School of Business Administration, Carroll Hall 012-A, University of North Carolina, Chapel Hill, North Carolina 27514). He received his M.L.I.R. and Ph.D. from Michigan State University. Professor Bigoness' research interests include role processes, conflict management, and labor-management relations. His research has appeared in the *Journal of Applied Psychology* and *Organizational Behavior and Human Performance*.

James A. Breaugh is an Assistant Professor of Management and Psychology at the University of Missouri–St. Louis (School of Business, University of Missouri–St. Louis, St. Louis, Missouri 63121). He received his Ph.D. from Ohio State University in Industrial-Organizational Psychology. Dr. Breaugh recently has conducted research on employee motivation, intergroup conflict resolution, employee satisfaction, and job design.

Kim S. Cameron is an Assistant Professor in the Graduate School of Business, University of Wisconsin, Madison (Graduate School of Business, University of Wisconsin, Madison, Wisconsin 53715). His B.S. and M.S. degrees were received from Brigham Young University, and his M.A. and Ph.D. degrees were received from Yale University. Dr. Cameron's primary research interests center on the assessment of effectiveness in organizations, particularly in organizations referred to as loosely coupled systems or organized anarchies. Other research projects are being conducted on the developmental life cycle stages of organizations.

R. J. Chesser is an Associate Professor of Organizational Behavior in the School of Management at Syracuse University, New York, and an independent management and organizational development consultant. He received his Ph.D. from Michigan State University.

Patricia Kelly Dawley received her M.B.A. in Management from New York University and is currently employed as a senior executive in the banking industry. Her interests are in the areas of personnel administration and human resource management.

Robert D. Dewar is an Associate Professor and Chairman of the Department of Organization Behavior in the J. L. Kellogg Graduate School of Management at Northwestern University (Graduate School of Management, Nathaniel Leverone Hall, Northwestern University, Evanston, Illinois 60201). He received his M.S. and Ph.D. in Sociology from the University of Wisconsin at Madison. Dr. Dewar's research interests focus on the stimulation of innovation, designs that enhance or thwart compliance with externally imposed regulations, and the testing and measurement of structural contingency effects on morale and conflict.

William F. Glueck was Distinguished Professor of Management, University of Georgia, until his death, May, 1980. In the year 1979-1980 he was President of the Academy of Management. He was the author of over 150 journal articles, monographs, cases, etc., in such journals as the *Academy of Management Review* and *Long Range Planning* and the author of a number of books including *Business Policy & Strategic Management*, 3rd Ed. (1980), McGraw Hill Book Company.

Ricky W. Griffin is an Assistant Professor of Management in the College of Business and Public Administration at the University of Missouri at Columbia (Department of Management, University of Missouri, Columbia, Missouri 65201). His current research interests include task design, leader behavior, perceived work environment, and organization-environment interactions. Professor Griffin received his Ph.D. in Organizational Behavior and Management at the University of Houston.

Raymond E. Hill is an Associate Professor of Organizational Behavior and Industrial Relations at the Graduate School of Business Administration of The University of Michigan (Graduate School of Business Administration, The University of Michigan, Ann Arbor, Michigan 48109). He has published research studies related to career choice processes and interpersonal relations in *Decision Sciences, Journal of Vocational Behavior,* and *Journal of Applied Behavioral Science.* His current research interest is primarily around career development and adult development processes.

Lawrence R. Jauch is a Professor in the Administrative Sciences Department at Southern Illinois University-Carbondale. Before coming to Southern Illinois University-Carbondale, Dr. Jauch taught at Kansas State University and the University of Missouri-Columbia. He has authored or co-authored numerous articles on organization behavior, theory, and policy in such journals as *Management Science, Academy of Management Journal,* and *Journal of Higher Education.* He also is the co-author of *The Managerial Experience: Cases, Exercises and Readings,* and *Organization Theory: An Integrated Approach.* Dr. Jauch currently is the Secretary for the Business Policy and Planning Division, Academy of Management.

Lane Kelley is an Associate Professor of Management in the University of Hawaii at Manoa (Department of Management & Industrial Relations, University of Hawaii at Manoa, 2404 Maile Way, Honolulu, Hawaii 96822). His research areas include management cross-cultural and ethnic studies, collective bargaining in complex organizations, and development and assessment of experiential exercises. He is the co-author of *Personnel Management in Action: Skill Building Experiences* (St. Paul, Minn.: West Publishing Co., 1977).

Thomas N. Martin is an Associate Professor in the Administrative Sciences Department at Southern Illinois University-Carbondale. He received his M.B.A. from the University of Santa Clara and his Ph.D. from the University of Iowa. Dr. Martin's current research interests include withdrawal behavior, with particular focus on absenteeism, tardiness, and turnover.

John G. Maurer is Dean and Professor of Management and Organization Sciences in the School of Business Administration, Wayne State University (School of Business Administration, Wayne State University, Detroit, Michigan 48202). He received his master's and doctoral degrees from Michigan State University. Previous writing and research have focused on open-system organization theory, the meaning of work, and work role involvement.

Edwin E. Miller is Professor of Industrial Relations at the Graduate School of Business Administration of The University of Michigan. He has been active in the Academy of Management, serving as President of the Midwest Academy of Management. He has published numerous articles on the personnel staffing process for both domestic and overseas settings and also is interested in the leadership attitudes and perceptions of American expatriate managers.

Richard N. Osborn is a Research Scientist, Battelle Human Affairs Research Centers, Seattle, Washington (1000 N.E. 41st Street, Seattle, Washington 98105). He received his D.B.A. from Kent State University. Dr. Osborn has conducted courses and seminars for students and managers interested in business, public administration, and voluntary organizations. Author of numerous articles and papers concerning organization and co-author of *Organization Theory: An Integrated Approach,* he currently is Program Chairman for the Midwest Academy of Management.

Saroj Parasuraman is an Assistant Professor of Management and Organization Sciences, School of Business Administration, Wayne State University, Detroit, Michigan 48202. She received a Ph.D. in Management from State University of New York at Buffalo in 1977, and an M.S. in Business Administration from Colorado State University in 1970. She also holds bachelor's and master's degrees in Economics from Delhi University. Ms. Parasuraman has presented papers at the regional and national meetings of the Academy of Management. Her research interests focus on the antecedents and outcomes of work-related stress, intra-organizational conflict and conflict management, and issues relating to women in management.

William D. Perreault, Jr. is an Associate Professor at the Graduate School of Business Administration of the University of North Carolina at Chapel Hill. His major interests include research methodology and problems in industrial marketing. His research has appeared in a number of journals, including the *Journal of Marketing Research, Management Science, Organizational Behavior and Human Performance,* and *Behavioral Science.*

Thomas J. Scanlan currently is Director of Education and Finance for the New York Region of the Christian Brothers. He received his B.A. in Physics from the Catholic University, Washington, his M.A. in Mathematics from New York University, and his Ph.D. in Organizational Behavior from Columbia University. He has taught Organizational Behavior at Manhattan College, New York. His research and writing interests are in the areas of communication and corporate social responsibility.

Uma Sekaran is an Assistant Professor of Administrative Sciences in Southern Illinois University, Carbondale. She received her M.B.A. from the University of Connecticut and Ph.D. from the University of California at Los Angeles. Dr. Sekaran has held administrative and managerial positions in the banking industry. Her continuing research includes interests in job design and cross-cultural studies in organizational behavior. Currently she is engaged in a special project investigating dynamics of dual career families and their implications for organizational change.

Donald P. Simet is an Assistant Professor of Organizational Behavior in the School of Management at the State University of New York at Buffalo. He received his Ph.D. in Sociology from the University of Wisconsin and his J.D. from the State University of New York at Buffalo. He currently is doing research on the power of professionals in organizations. Dr. Simet has published several articles relating organizational behavior to legal issues.

Linda Smircich is an Assistant Professor of Organizational Behavior in the College of Business at Pennsylvania State University (609 Business Administration Building, The Penn State University, University Park, Pennsylvania 16802). She received her Ph.D. from Syracuse University, New York. The focus of her research is interpersonal relationships and processes in organizations.

Richard L. Smith was a Research Associate in the School of Business at Wayne State University when the research effort and writing for this article were performed. He received his Ph.D. in Psychology from Wayne State University. He has published in several psychology journals. His research work has been mainly in the area of family and institutional influences on individual adjustment. He currently is employed by General Motors Corporation in its Personnel Planning and Analysis Group.

Jeffrey A. Sonnenfeld is an Assistant Professor of Organizational Behavior at the Harvard Graduate School of Business Administration. He received his A.B., M.B.A., and D.B.A. from Harvard. His research and consulting is focused on the ways by which companies use structural mechanisms to perceive and respond to public affairs issues. In particular, his publications have focused on organizational preparedness for the aging work force and on corporate legal compliance. A second line of research interest involves an interdisciplinary study of managerial careers.

Stephen A. Stumpf is an Assistant Professor of Organizational Behavior and Management at the Graduate School of Business Administration, New York University (Graduate School of Business, New York University, 100 Trinity Place, New York, New York 10006). He received his M.B.A. in Behavioral Science from the University of Rochester and his Ph.D. in Organizational Behavior and Management from New York University. Dr. Stumpf's research interests are in the areas of decision making, individual and organizational assessment, and career development.

Michael L. Tushman is an Associate Professor at the Graduate School of Business, Columbia University (Graduate School of Business, Uris Hall, Columbia University, New York, New York 10027). He received a master's degree from the School of Industrial and Labor Relations at Cornell University and a Ph.D. from the Sloan School of Management at Massachusetts Institute of Technology. Dr. Tushman's general research interests focus on problems in the management of innovation, with a particular interest on the impact of communication networks on the innovation processes.

Donald J. Vredenburgh is an Associate Professor in the Department of Management at Baruch College, City University of New York. He acquired his Ph.D. in Management Studies from the State University of New York at Buffalo. Previous research has focused on leadership. Other research interests include technology and organization structure.

Reginald Worthley is a Professor of Decision Sciences, specializing in survey analysis, design of experiments, and quality control. He has published theoretical and applied articles in *Annals of Statistics, JASA, Decision Sciences*, and other journals.

Samuel J. Yeager is an Assistant Professor jointly apointed in the Urban Affairs Center and Political Science Department, Wichita State University (Department of Political Science, Wichita State University, Fairmount College of Arts & Sciences, Wichita, Kansas 67208). He holds a Doctorate in Public Administration from the University of Georgia. He has authored or co-authored articles and chapters in books and is co-recipient of the 1975 Douglas McGregor Memorial Award. Dr. Yeager's current research and consulting activities focus on the interaction of professional associations and their members.

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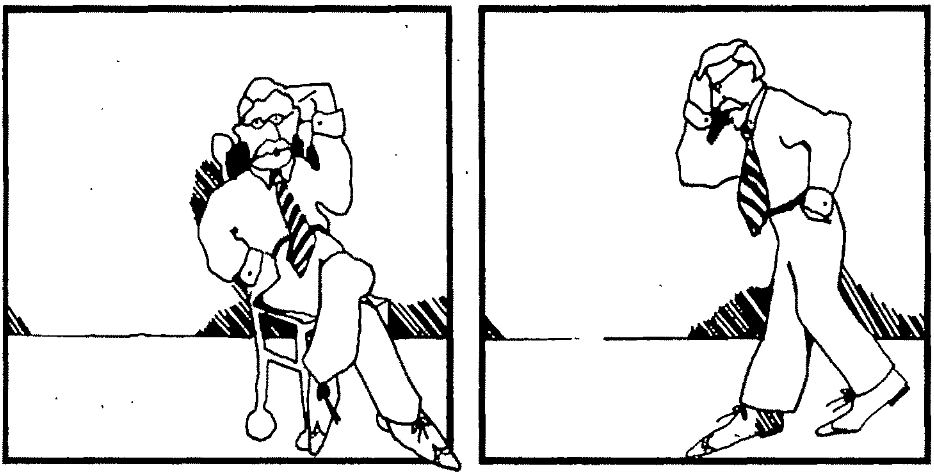

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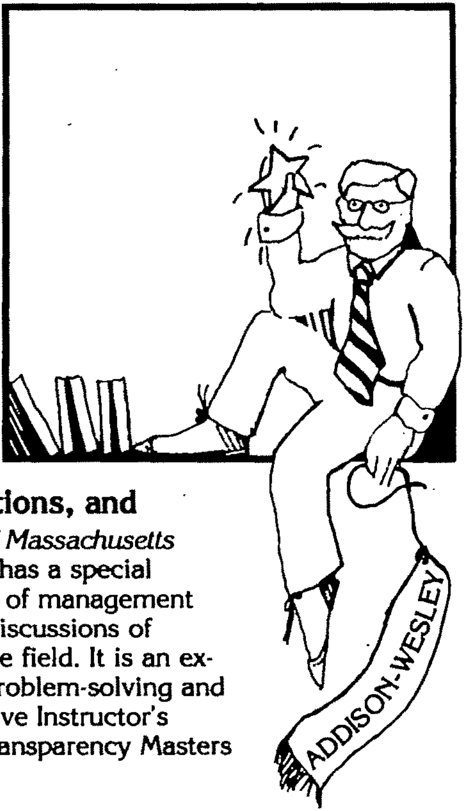

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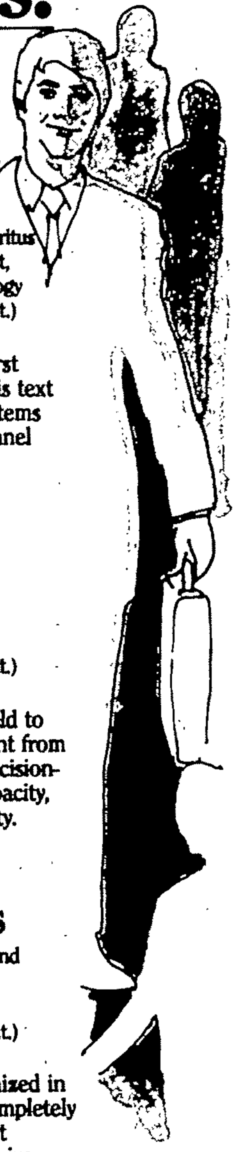

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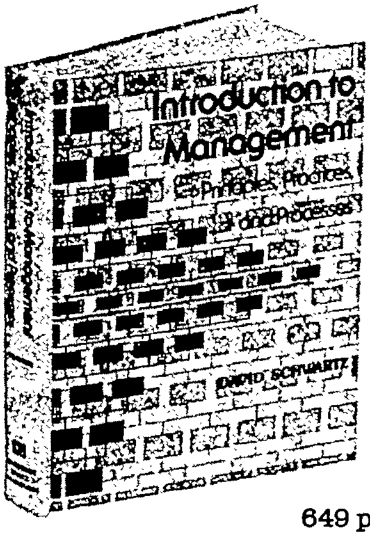
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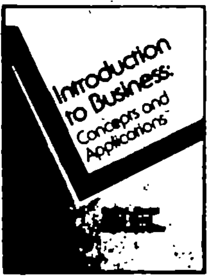

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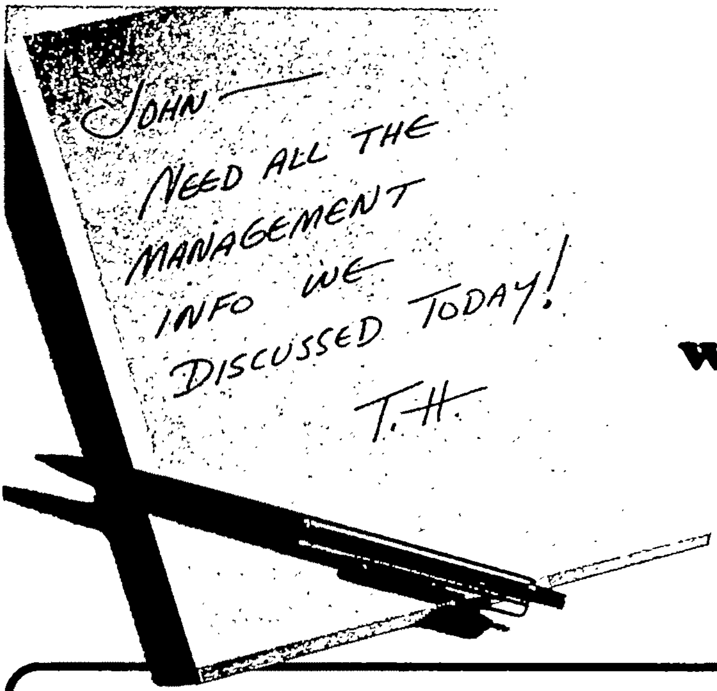

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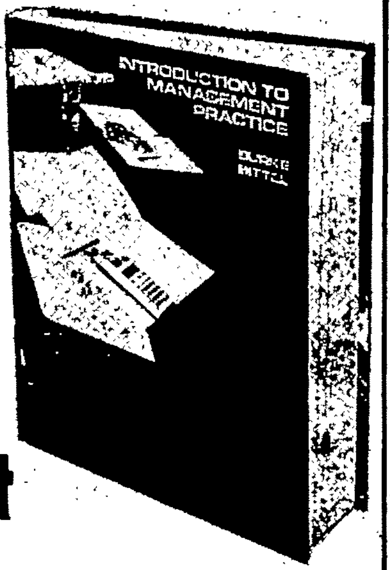

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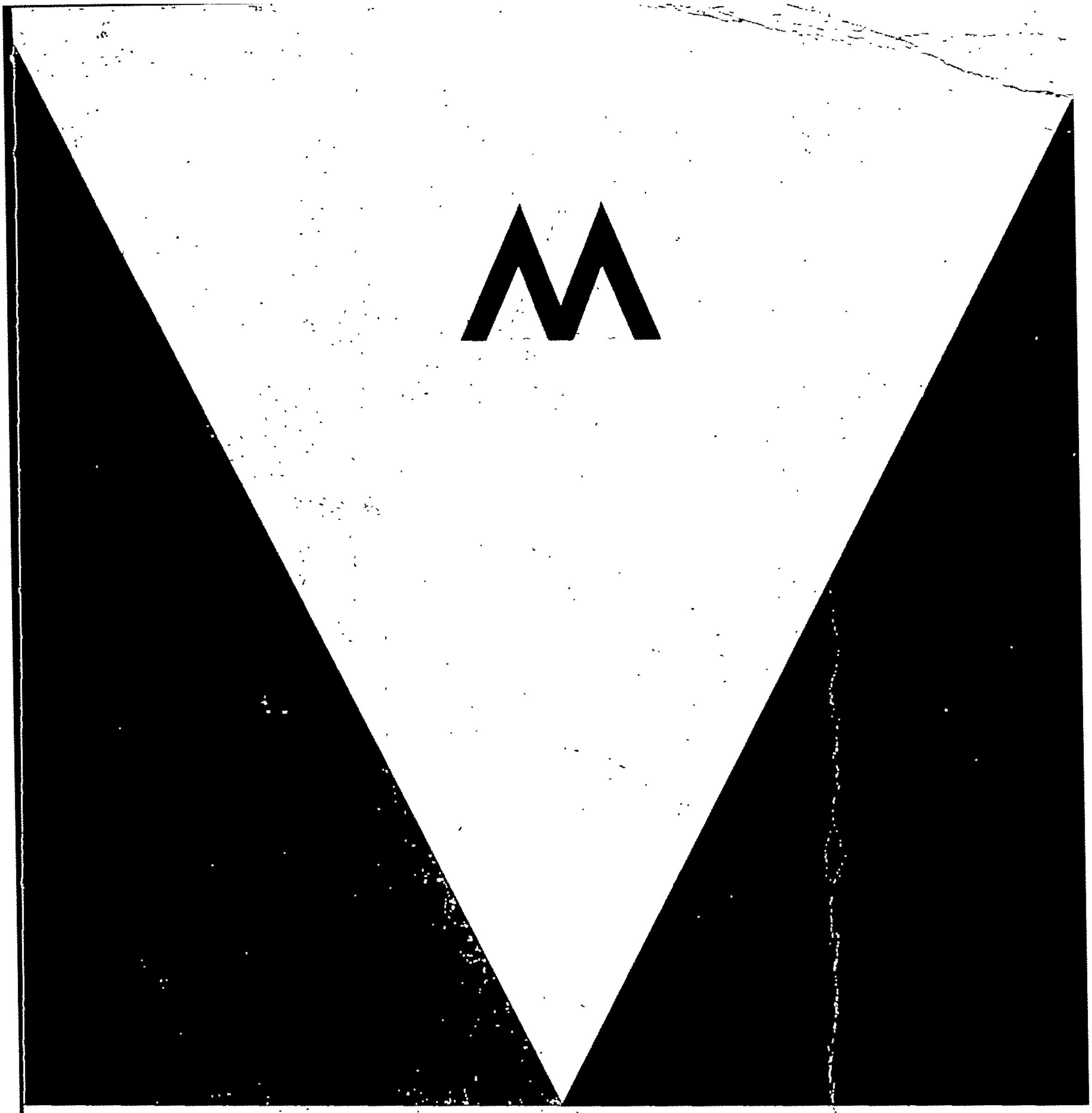

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Supervisory Behavior and Employee Turnover: A Field Experiment[1]

DAVID KRACKHARDT
University of California, Irvine
JOHN McKENNA
California State University, Chico
LYMAN W. PORTER
University of California, Irvine
RICHARD M. STEERS
University of Oregon

Specific supervisor interactions with tellers in 50 branches of a commercial bank were examined for their contribution to turnover rates. For those branches that instigated such actions, turnover was significantly lower than in the matched control groups. Moreover, actual implementation was found to be influenced by the efficiency level of the individual branches.

Turnover has been the object of extensive investigation in organizational behavior. One reason for this has been organizations' concern over the dysfunctional consequences of high turnover rates. In addition, turnover is a specific behavior, easily measured, with interesting implications for both practitioners and theorists (Price, 1977). Although studies of employee turnover abound, the vast majority of these have been correlational. This literature is helpful in identifying potential determinants of turnover, but a more pressing question concerns the extent to which variables can be manipulated by the supervisor to provide a change in turnover rates.

One consistent finding in the research on turnover is its relationship to tenure; the longer employees have been with an organization, the less likely they are to leave. Thus in organizations with high turnover, the problem often stems from the inability to retain their newest members. It has been observed recently that newcomers require more social cues for what is

---

[1] Financial support for this study was provided by the Office of Naval Research, Grant #N00014-76-C-0164. The authors which to acknowledge Penny Wright for her assistance in the data collection phase of this study.

expected from them than do veteran employees (Buchanan, 1974; Katz, 1978; Wanous, 1977).

The role of the supervisor is key to a new employee's job experience for several reasons. First, supervisors control the degree of structure, ambiguity, and conflict in the work itself. Second, they provide informal and formal feedback to the employees on their work behavior. Third, they control rewards and even the job security that the employees may enjoy. All these parts of the job experience are particularly important to newcomers who are trying to orient themselves in a new organizational environment (Katz, 1978; Van Maanen, 1975).

The supervisor's role is clearly important to the employee, but the exact prescription that should be given to the supervisor to reduce turnover is less obvious. For example, it has been found that work characteristics such as job variety, autonomy, and responsibility usually associate negatively with turnover (Ross & Zander, 1957; Taylor & Weiss, 1969; Waters & Roach, 1971). However, exceptions have been noted (Kraut, 1975), and moderators such as high growth needs have emerged to explain conflicting or weak results (Hackman & Lawler, 1971). Findings that both autonomy and role clarity (Ilgen & Seely, 1974; Lawler, 1973; Porter & Steers, 1973) are negatively associated with turnover lead one to speculate either way on the possible effects of providing more or less formal structure on a job.

Attitudes also have related inconsistently to turnover rates. Although overall job satisfaction has been repeatedly linked to turnover, the sources of that satisfaction (or dissatisfaction) have not been as uniform in their relationship to turnover. Satisfaction with the supervisor, for example, has had mixed relationships with turnover of subordinates: curvilinear relationships (Fleishman & Harris, 1962; Skinner, 1969), insignificant relationships (Koch & Steers, 1978; Taylor & Weiss, 1969), and negative relationships (Graen & Ginsburgh, 1977; Hulin, 1966). Satisfaction with the immediate work group initially was found to be correlated with turnover (Blau, 1957; Evan, 1963; Farris, 1971; Shils & Janowitz, 1948). More recently, however, this relationship has not been supported (Granovetter, 1974; Kraut, 1975).

Given these and other ambiguous results, a multiple stage process was developed with the goal of reducing bank teller turnover. The first stage involved gathering preliminary data and identifying which supervisor-controlled variables could be reasonably expected to be effective at reducing turnover in the particular organizational setting studied. In the second stage, a supervisory intervention was designed and implemented based on the information collected in the first stage.

METHOD

Procedure

Sample—Bank tellers were chosen as the subjects of the experiment for two reasons. First, tellers have a high turnover rate, frequently on the order of 50 percent annually (80 percent of this turnover occurs in the first six months on the job). Although the particular bank chosen has a turnover rate comparable to that of its competitors, top management nonetheless felt that it was too high and consequently detrimental to the effective operation of the organization. Second, the bank was composed of similar but physically separated working units (branches), which facilitated a matched group experimental design with little chance of confounding interaction between the experimental and control groups.

A total of 50 branch offices of the bank were selected for the experiment. The branches ranged in size from 2 to 15 tellers and represented a broad spectrum of locations and clienteles. Of these, 25 pairs were matched by size, location (residential vs. commercial), and average income level of their depositors. The branches for each pair were then assigned randomly to either the control or experimental group.

Preliminary Data—Preliminary data were gathered prior to the intervention to determine what, if any, recurring themes in the teller's work environment might be associated with his or her decision to stay or leave the organization. The researchers conducted interviews and administered questionnaires to separate groups of bank employees. This information was subsequently shared with the supervisors at their workshops to facilitate their choice of strategies for reducing turnover.

The interviews were conducted with 24 tellers and 6 branch managers in a total of 15 branches. These branch offices were selected randomly from those not involved in the main study. Generally, it was found that the tellers were concerned with such matters as professional growth and development, relationships with their supervisor, and communication to and from management.

The questionnaires were administered to all the tellers in the 50 branches participating in the study. Questions focused on the issues revealed by the interviews and other job attitudes. Also included was a question concerning how long the teller intended to stay with the bank, a question that has been shown to have strong predictive validity (Bluedorn, 1979). With 60 percent of the questionnaires returned, the findings confirmed the investigators' expectation that one important way to influence the pivotal factors governing turnover (as perceived by the tellers questioned) would be through the immediate supervisor. For example, the degree to which supervisors were perceived as helping to develop skills in the tellers who were not expecting a promotion was significantly correlated with intended length of stay at the bank ($r = .43$, $p < .01$). Similarly, the degree to which the supervisor "made life easier" was associated with the intended length of stay ($r = .50$, $p < .01$). Those tellers who expected a promotion were most sensitive to role clarity (correlation with intended length of stay $= .55$, $p < .01$), an issue that also is under the control of supervisors.

Duration of Intervention—Four months were allotted for the experimental period for two reasons. First, it allowed sufficient time to implement the objectives that the supervisors had set for themselves. Second, with teller turnover averaging 50 percent annually, it was expected that turnover would be around 15 to 20 percent in the control branches during the 4-month experiment. This expected rate was deemed sufficient in size to allow observable and significant differences to emerge between the experimental and control groups, should the intervention be successful.

The Supervisor Workshop

First-line supervisors from the experimental branches attended two workshops on teller turnover and its causes. At the first meeting, the workshop facilitators (training officers from the bank) asked the supervisors to identify issues that they felt were contributing to the problem of turnover. These issues were discussed in light of what emerged from the preliminary interviews and questionnaires. Each supervisor was then asked to return to his or her branch and discuss the issues and their possible solutions with the tellers and managers.

At the second meeting (one week later), the supervisors discussed the reactions of the branch personnel to their ideas. They generated several possible specific objectives that they felt could be accomplished within a 4-month period and would have a reasonable chance of improving the turnover rates. Of these, the three objectives listed below were selected by the group as potentially the most effective without demanding too much of their time. Each supervisor, then, agreed to try to implement these three objectives over the next four months:

1. Meet informally with each teller individually at least once during the next three months. The purpose of this activity was multifaceted. In general, it provided an opportunity for the supervisor to focus on the personal needs, questions, and complaints of each teller. In addition, the teller could receive feedback on his or her performance. The exact format and content of these meetings, however, were left up to the supervisor to work out mutually with the tellers.

2. Meet with the tellers as a group at least four times during the next three months. This objective was similar to the first in many respects: it provided a forum for the exchange of questions, information, and recognition. In addition, work group issues could be discussed and resolved. Again, the content and format of these meetings were left up to the supervisors. Such flexibility allowed the needs of the particular branch to be met.

3. Set up a specific cross-training schedule for those who desired cross-training as part of their job. (Cross-training involved allowing tellers the opportunity to become skilled at a number of functions within the branch.) It was anticipated from the interviews and questionnaires that somewhere between one-fourth and one-half of the tellers would want such an opportunity. The supervisors felt that those tellers who were not ambitious or career oriented would probably consider cross-training an encumbrance and therefore should be omitted from this activity. For

those who did want this opportunity, however, it was anticipated that the experience would be valued highly as a way of breaking up the monotony of teller work as well as a stepping stone toward advancement possibilities.

A reward was promised to all supervisors who successfully attained all three objectives. The formal reward was to be a letter of commendation (to be placed in the supervisor's personnel file), along with recognition at a breakfast given in honor of all the participants by the regional vice presidents. Additionally, it was made clear to the supervisors that this project had the full endorsement of top management of the bank and that there would be substantial recognition if they were successful in implementing the program.

In order to discover the extent to which the branches in the experimental group actually reached each of the objectives, at the conclusion of the intervention questionnaires were sent to the tellers who had participated in the experiment. They were asked whether or not they had been involved in the activities specified. Implementation, then, was measured as follows: A branch was considered to have met an objective if, and only if, more than half of the tellers responding to this questionnaire in the branch indicated that they had been involved in the specific activity during the intervention period. Thus, a majority of the tellers who had been employed at the branch had to agree that a particular objective was reached (at least from their personal experience) before that branch was identified as having implemented that objective.

RESULTS

Voluntary turnover data were obtained directly from the personnel department at bank headquarters. The results are shown in Table 1. As can be seen, implementation was associated with a lower branch turnover rate compared to the matched control counterpart (at the .05 level).

TABLE 1

Turnover (Matched Pair Comparison) as a Function of the Number of Goals Implemented[a]

	Number of Goals Implemented in Experimental Branches		
Turnover (Matched Pair Comparison)	*0*	*1*	*2*
Number of pairs for which the turnover in the experimental branch was *less than* the turnover in the matching control branch	2(40%)	5(50%)	5(100%)
Number of pairs for which the turnover in the experimental branch was *equal to* the turnover in the matching control branch	1(20%)	1(10%)	0(0%)
Number of pairs for which the turnover in the experimental branch was *greater than* the turnover in the matching control branch	2(40%)	4(40%)	0(0%)
Total number of pairs	5(100%)	10(100%)	5(100%)

[a] Kendall's tau $= .37$, $p < .05$.

In examining Table 1, note should be made of some problems in the implementation of this research that resulted in a reduction of the number of branches represented in the table. Of the 25 experimental branches, only individuals in 20 branches responded to the implementation questionnaires. Therefore, the remaining five branches were ignored for this part of the analysis. Also, implementation of only two of the objectives was used to predict turnover differences. The third, that of setting up a cross-training schedule for those who wanted it, was omitted for two reasons: First, although no tellers, or few tellers, claimed that they were involved in this goal, this did not necessarily indicate that the supervisor had not in fact lived up to the agreement made at the supervisor workshop. It was quite possible for none of the tellers in a branch to desire cross-training; consequently, they would have been exposed to no cross-training and would respond on the questionnaire appropriately. There would be no way to distinguish such a teller response from one who had never been provided the opportunity to go through cross-training. The second reason was that the third objective added little predictability of turnover. Although cross-training was positively associated with lower turnover, it contributed very little to the explained variance beyond that explained by the other two objectives. Specifically, the overall association between the implementation of two objectives (group and individual meetings) was .37 (Kendall's tau, see Table 1). The inclusion of the third objective, cross-training, in Table 1 along with the other two objectives, would only increase the power of association between number implemented and turnover to .397. Given the questionable validity of the measure of the cross-training objective and given that the other two objectives explain almost as much variance as all three did together, it was decided that analysis would be conducted on the implementation of the two teller meeting objectives only.

Each of the experimental branches that implemented both the group meeting goal and the individual meeting goal had lower turnover during the course of the study than did the corresponding control branch. As would be expected in a random assignment, turnover rates in the five experimental branches that implemented neither of the objectives in question were not different from the control group of branches. The difference in turnover rates was not improved noticeably in the groups that implemented only one of the objectives. However, the strength of the success of those branches that implemented both objectives was sufficient to provide a significant overall association between number of objectives implemented and turnover (Kendall's tau $= .37$, $p < .05$).

The raw turnover data in Tables 2 and 3 confirm the same trend. Table 2 displays the raw turnover rates for each of the three groups of branches (implementing none, one, or two goals) during the six months prior to the start of the intervention. In all three groups, turnover was not significantly different between the experimental branches and the corresponding control branches. The turnover rates during the intervention, on the other

TABLE 2
Turnover Prior to the Intervention Related to Number of Goals Implemented During the Intervention

	Number of Goals Implemented in Experimental Branches During Intervention		
Prior Turnover (Raw Data)	*0*	*1*	*2*
In experimental branches (Number who left/Number at start of study)	3/26(=11.5%)	12/58(=20.7%)	3/44(=6.8%)
In matching control branches (Number who left/Number at start of study)	5/35(=14.3%)	18/72(=25.0%)	7/47(=14.9%)
Difference of proportions test	$Z=.314$ $p=$ ns	$Z=.583$ $p=$ ns	$Z=1.231$ $p=$ ns

TABLE 3
Turnover (Raw Data) as a Function of the Number of Goals Implemented

	Number of Goals Implemented in Experimental Branches		
Turnover (Raw Data)	*0*	*1*	*2*
In experimental branches (Number who left/Number at start of study)	5/26(=19%)	9/58(=16%)	2/44(=5%)
In matching control branches (Number who left/Number at start of study)	3/35(=9%)	14/72(=19%)	12/47(=26%)
Difference of proportions test	$Z=-1.220$ $p=$ ns	$Z=.583$ $p=$ ns	$Z=2.773$ $p<.01$

hand, were significantly and substantially lower in the experimental branches that implemented both objectives than in their matched counterparts. The experimental branches held turnover to 5 percent; their matched control branches experienced a 26 percent turnover rate ($p<.01$).

The Effect of Efficiency

The question of why some branches chose to participate actively in the experiment while others refrained may be due to several local and independent reasons. It was observed at the supervisor workshops, however, that some supervisors were less enthusiastic about the nature of the experiment than others. Their major objection was the amount of time it would take out of an already crowded working day. Although the researchers did not measure directly how the supervisors responded to this issue in each case, they did have an indicator of "branch efficiency" (as computed monthly by the bank). This index is calculated by dividing the amount of work actually accomplished (number of checks processed, etc.) by the amount of work that should have been accomplished if everyone had been working at a standard efficiency level. Branches then could be identified as either high in efficiency (i.e., the output exceeded the standard) or low in efficiency.

TABLE 4
Efficiency Rating as a Predictor of Number of Goals Implemented[a]

Number of Goals Implemented	*Efficiency Rating* *Low*	*High*
Number of experimental branches that implemented *0 goals*	4(44%)	1(9%)
Number of experimental branches that implemented *1 goal*	4(44%)	6(55%)
Number of experimental branches that implemented *2 goals*	1(11%)	4(36%)
TOTAL	9(100%)	11(100%)

[a] Kendall's tau = .45, $p < .05$.

TABLE 5
Efficiency Rating as a Predictor of Turnover (Matched Pair Comparison)[a]

Turnover (Matched Pair Comparison)	*Efficiency Rating* *Low*	*High*
Number of pairs for which the turnover in the experimental branch was *less than* the turnover in the matching control branch	5(45%)	9(64%)
Number of pairs for which the turnover in the experimental branch was *equal to* the turnover in the matching control branch	1(9%)	3(21%)
Number of pairs for which the turnover in the experimental branch was *greater than* the turnover in the matching control branch	5(45%)	2(14%)
Total number of pairs	11(100%)	14(100%)

[a] Kendall's tau = .27, $p < .10$.

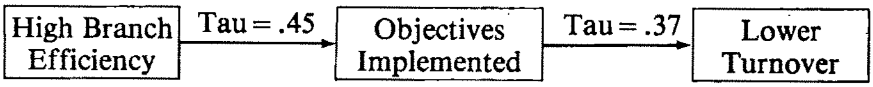
As Table 4 shows, this efficiency rating is a useful antecedent of the number of objectives implemented (overall association: Kendall's tau = .45, $p < .05$).

Only one of the nine low efficiency branches completed both objectives, whereas over one-third of the high efficiency branches were able to do so. Conversely, only 1 of the 11 high efficiency branches failed to meet either objective, but almost half (4 out of 9) of the low efficiency branches failed to do so.

As one would expect, efficiency is also a reasonable antecedent, then, of turnover. Table 5 shows that nearly two-thirds of the high efficiency experimental branches had lower turnover than did their matched control branch; only 2 of the 14 high efficiency branches had higher turnover. The low efficiency branches were evenly split: half had lower turnover than did their control counterparts, and half had higher turnover (again, as would be expected in a random assignment). The overall association between turnover and efficiency was a modest .27 ($p < .10$).

The model suggested by the data from this experiment is:

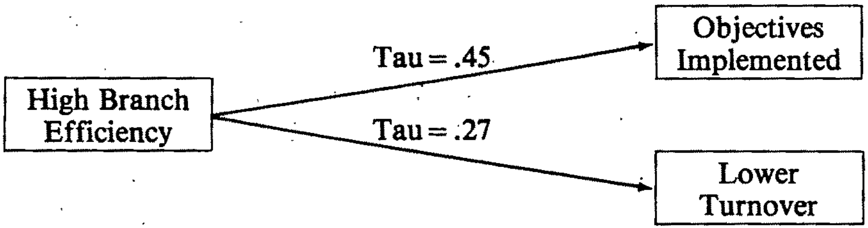
Model 1:



This model is supported by the overall correlations at both the links (from Tables 1 and 4) as well as the contingency tables showing the comparison in turnover for those branches with both objectives implemented (Table 3).

It could be argued, however, that branch efficiency is the controlling variable, predicting both number of objectives and turnover, thus obviating the need for objectives as an intermediate variable. This possibility is represented in the following model:

Model 2:



The comparative strength of these models can be evaluated with the use of partial rank order correlations (Siegel, 1956):

Correlation between turnover and objectives implemented (controlling for efficiency) = .34
Correlation between turnover and efficiency (controlling for objectives implemented) = .15

These figures indicate that controlling for efficiency does little to undermine the primary relationship between turnover and objectives implemented as posited by Model 1. Additionally, if Model 2 were correct, then the relationship between efficiency and turnover would be unaffected by controlling for number of objectives. In fact, however, this correlation is reduced by almost half when so controlled. It was thus concluded that the implementation of the objectives was a substantially stronger antecedent of turnover than was branch efficiency and that Model 1 was therefore more strongly supported than the alternative Model 2.

DISCUSSION

The purpose of this investigation was to determine whether turnover could be controlled through a supervisory intervention. Results reported here suggest that such a program can indeed result in lower turnover rates. The experimental branches that met their objectives in the areas of group meetings and individual counseling sessions during the course of the experiment had significantly lower turnover than did their control counterparts. Both the magnitude (5 percent vs. 26 percent) and the significance ($p < .01$) of this difference were substantial, indicating that the implementation of these activities was a major contributor to the control of turnover in the experimental branches.

This conclusion must be tempered by three observations, however. First, the number of branches involved in this comparison is small (5 experimental, 5 control), as is the number of tellers leaving (2 in the experimental, 12 in the control group). Although the probability level is sufficient to leave one confident that such a difference did not occur by chance alone, it is not clear how much of the difference is attributable to the intervention and how much may have been due to random fluctuations. Second, neither activity by itself made a noticeable difference in turnover rates. It was anticipated that the objectives would be additive in their effect; instead, it would appear that there may have been an interactive effect between them. Perhaps a minimum intensity of interventions is required—a threshold level—before an observable behavioral difference can be expected. Third, although the prior differences in turnover were not significant, some differences did exist. In particular, the turnover rate for the experimental group that eventually implemented both objectives was already lower than was the matched control group, although not significantly lower. This leads one to speculate whether the management teams in those branches that implemented the objectives were proficient in dealing with the turnover problem prior to the intervention, accounting for much of the difference in the results. There may be some credibility to this argument, but it still remains the case that these supervisors embraced these objectives with the concurrent effect of improving their edge over the control branches sufficiently to yield strongly significant results.

A related question arises concerning the key role of branch efficiency as described in Model 1. A possible explanation here is that supervisors who are skilled at structuring the work efficiently at a branch are more likely to have the time to incorporate the experimental activities into their other tasks. Again, the argument could be raised that the skilled supervisors had more to do with the turnover differences than did the activities themselves. Countering this line of reasoning are two observations, however. First, if the supervisors were the main cause of turnover differences, and if efficiency were an indication of quality supervision, then Model 2 should have been a stronger predictor of turnover than Model 1, as discussed earlier. Instead, it was found that the number of objectives implemented was more highly associated with turnover than was branch efficiency—or, by inference, supervisory skill. Second, according to the bank's own personnel studies, variance in branch efficiency is not due to managerial or leadership skills, because personnel turnover produces little change in the efficiency ratings. Efficiency appears to be a relatively stable branch characteristic rather than a representation of the quality of supervision. Hence, a more plausible explanation of its impact on the propensity of supervisors to engage in such experimental activities might be that high efficiency branches have more slack time in their daily workload. They can take the time to have group meetings without jeopardizing their position as a branch producing "above standard" output. A low efficiency branch, however, might be concerned primarily with getting the day's work done;

it may have less tolerance for supposedly "superfluous" interruptions such as those suggested by the intervention.

In conclusion, it would appear that it is possible to control turnover using correlates identified in the literature. In particular, supervisor behavior was shown to be an effective focal point for manipulating these correlates under certain conditions. These conditions appear to be related to the amount of slack in the workload. When the proposed intervention did not interfere with the completion of the standard output for a working unit (i.e., there was slack in the system), then supervisors had a high probability of succeeding at controlling turnover. From an organization's view, these findings suggest a potentially useful process for dealing with difficult and costly turnover problems.

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Effects of Role Stress-Job Design-Technology Interaction on Employee Work Satisfaction[1]

AHMED A. ABDEL-HALIM
Illinois State University

The interaction effects of each of three role stress variables—role conflict, ambiguity, and overload—and job design characteristics on employee satisfaction with work are examined across different technology organizations. These role variables were found to be associated with lower work satisfaction for individuals on simple, low-scope jobs in long-linked (manufacturing) technology and for individuals on complex, high-scope jobs in mediating (service) technology.

Research on role theory has focused on role conflict, role ambiguity, and role overload as sources of role stress in organizations. (See reviews by Beehr & Newman, 1978; French & Caplan, 1972; Kahn & Quinn, 1970; House & Rizzo, 1972; Newman & Beehr, 1979; Rizzo, House, & Lirtzman, 1970.) Although the evidence suggests that role stress variables are generally aversive, there is some indication that they may not be uniformly so. Individuals with different personality characteristics (Beehr, Walsh, & Taber, 1976; Brief & Aldag, 1976; Caplan & Jones, 1975; Johnson & Stinson, 1975; Morris & Snyder, 1979; Organ & Greene, 1974; Schuler, 1977b; Szilagyi, Sims, & Keller, 1976) or in different organizational or job situations (Abdel-Halim, 1978; Beehr, 1976; Miles, 1976; Miles & Perreault, 1976; Schuler, 1975, 1977a; Szilagyi et al., 1976; Szilagyi, 1977) may respond differently to role conflict, ambiguity, and/or overload.

A review of the role theory literature (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Kahn & Quinn, 1970; Katz & Kahn, 1978) suggests that role variables interact with other organizational factors (such as job

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design, technology, and structure) to determine employee responses on the job. Recent research—for example, Abdel-Halim (1978) and Brief and Aldag (1976)—emphasizes the need to develop linkages between role theory and job design literature. In exploring the nature of the role variables-job design relationships, some researchers have focused on the effects of job design together with other organizational factors (e.g., structure and technology), either independently or in a contingency model, on the levels of role variables (conflict and/or ambiguity) in an organization or among different groups within the same organizational system (Moch, Bartunek, & Brass, 1979; Morris, Steers, & Koch, 1979; Rogers & Molner, 1976; Schuler, 1977c). Other researchers (Abdel-Halim, 1978; Beehr, 1976; Tosi, 1971) have examined the effects of the interaction between role variables and job design characteristics on employee responses on the job.

PREVIOUS RESEARCH

Role Stress and Job Design

The results of previous research examining the potential interaction between role variables and job design characteristics are somewhat mixed. Abdel-Halim (1978) and Beehr (1976) provided data from predominantly manufacturing organizations supporting the hypothesis that employees on simple, structured jobs were significantly less satisfied under high rather than low levels of role stress, while those on complex, unstructured jobs were unaffected by the level of role stress. Similarly, Keller, Szilagyi, and Holland (1976) found that, in a manufacturing organization, boundary-spanning (complex) activities were associated with higher role conflict and lower job satisfaction for a sample of employees in lower level (relatively simple) supervisory roles, but they were positively related to job satisfaction and unrelated to role variables for two samples of higher level managers and engineers on relatively more complex jobs.

On the other hand, Miles and Perreault (1976) reported that, in a more complex (service) technology organization, role conflict was most aversive for employees on jobs with external boundary-spanning (complex) activities and least aversive for those on relatively less complex, highly "buffered" jobs. Similarly, Tosi (1971) found no significant interactions between role variables and job autonomy (influence) in a service (finance) organization. There was a tendency, however, for job autonomy to be associated with greater job satisfaction and lower job anxiety under a condition of low rather than high role stress.

These previous studies have been limited, however, to examining role stress-job design interactions largely in single or same-technology organizations. How the interaction between role variables and job design might affect employee responses in organizations employing distinctly different technologies remains largely unexplored in the empirical literature. The seemingly inconsistent findings of previous research may be attributed, at least in part, to differences in the types of organizations studied, thus reflecting the influence of the broader technology factor. It is noteworthy, for instance, that role stress variables were more aversive for individuals on simple rather than complex jobs in manufacturing technology organizations (Abdel-Halim, 1978; Beehr, 1976; Keller et al., 1976) and also were more aversive for individuals on complex rather than simple jobs in service technology organizations (Miles & Perreault, 1976; Tosi, 1971).

The present study attempts, therefore, to examine the potential influence of organizational (manufacturing/service) technology on the interaction between each of three role variables—role conflict, ambiguity, and overload—and job design characteristics in determining the level of employee satisfaction with the work itself. This is consistent with recent statements by O'Connell, Cummings, and Huber (1976) and Schuler (1977c) suggesting that research in organizational behavior and theory, especially in job design and role theory, needs to emphasize interaction among multiple variables including organizational technology.

Technology, Role Stress, and Job Design

Previous research (Mahoney & Frost, 1974; Parkington & Schneider, 1979; Rousseau, 1977; Thompson, 1967) indicates that organizations with different technologies tend to possess different properties that might influence how people respond to role stress or job design variables and consequently may have an impact on the manner in which these two sets of variables interact. Rousseau (1977) reported, for example, that employee affective responses to job design characteristics were highest in mediating (banking) technology and were lowest in long-linked (manufacturing) technology. Additionally, Kahn et al. (1964) indicated that the functional interdependence requirements of organizational technology had an influence on how people responded to, and coped with, role stress. According to them:

> When functional dependence of role senders is of lesser magnitude, the focal person is freer to cope (via avoidance) with the conflicting pressures they impose, thereby escaping some of the strains that he would otherwise experience. The conclusion one might draw is that roles in which one's senders are highly dependent are dangerous and are to be avoided at all costs... for in such roles one seems locked into constant association with his role senders, unable to ward off their pressures when they prove stressful (1964, p. 215).

Kahn et al.'s research findings thus suggest that role variables are more stressful and dissatisfying for employees whose jobs are located at or near, rather than away from, the areas of interdependence or interaction as required by organizational technology.

It should be noted, however, that the locus of functional interdependence differs in long-linked (manufacturing) vis-à-vis mediating (service) technology organizations (Thompson, 1967). In the former, greater serial interdependence is required at or closer to the center of the core technology, which is buffered from environmental influences or disturbances (Thompson, 1967). In the latter, greater interaction is required at the boundaries or areas of contact with the task environment (Aldrich & Herker, 1977; Parkington & Schneider, 1979; Thompson, 1967). According to Aldrich and Herker, for example, "organizations with a long-linked technology attempt to buffer most of their units and roles from the environment, and have a lower proportion of boundary roles [while] organizations with a mediating technology link clients or customers with each other, as in the case of banks. . . [and] should have the highest proportion of boundary roles, as boundary roles are their line roles" (1977, p. 222). Additionally, Parkington and Schneider noted that employees in service (banking) organizations "often are as close psychologically, organizationally (hierarchically and geographically) and physically to the organization's clients as they are to other employees of the organization, or perhaps even closer" (1979, p. 270). Hence, simple, low-scope jobs often located at or near the center of operations in long-linked (manufacturing) technology and complex, high-scope jobs often interfacing with the task environment in mediating (service) technology are most vulnerable to role stress. Consequently, the levels of role variables become important in determining the work satisfaction of individuals on these jobs.

HYPOTHESIS

Based on the above discussion and rationale, the general hypothesis investigated in this study is that *role stress variables, job design characteristics, and organizational technology will interact such that individuals on simple, low-scope jobs in long-linked (manufacturing) technology and individuals on complex, high-scope jobs in mediating (service) technology will be less satisfied with their work under high rather than low levels of role stress.* No significant differences in work satisfaction are predicted, however, for individuals on complex jobs in long-linked technology or on simple jobs in mediating technology under different levels of role stress variables.

METHOD

Samples

Data were collected from two samples: (a) a manufacturing sample consisting of 89 managerial and staff personnel working in production and other related units of a large, heavy equipment manufacturing firm and (b) a banking sample including 81 managerial and nonmanagerial personnel selected from five small to medium-size banks. Both types of organization were located in the Midwest. Paper-and-pencil questionnaires were administered to the respondents at work and in the presence of the researcher and/or his assistant. Respondents were randomly selected by their respective organizations, and all those contacted agreed to participate in the study. The importance of accurate responses was stressed, and respondents were assured of the complete anonymity and confidentiality of their responses.

In the manufacturing sample, the average age was 45 years, with a range of 30 to 65, and average time on present job was 2.91 years. All respondents were white males and had at least a high school diploma (with 52 percent having a bachelor's degree or higher). In the banking sample, on the other hand, the average age was 38 years, with a range of 18 to 60, and average time on present job was 3.04 years. About 55 percent of the respondents were males and 98 percent had at least a high school diploma (with 32 percent having a bachelor's degree or higher).

Measures

Scale characteristics, means, standard deviations, and internal consistency reliabilities are presented in Table 1. Descriptions of the scales used in the study are provided below.

Role Conflict, Ambiguity, and Overload—Role conflict is defined as the perceptions of incompatible or incongruent demands placed on role incumbent. Role ambiguity refers to a condition in which the information available to a given organizational position is inadequate or unclear. These two role variables were measured by the instrument developed and validated by Rizzo et al. (1970). Accordingly, role conflict was measured by an eight-item index and role ambiguity by a six-item index. Respondents were asked to indicate the extent to which the scale items were descriptive of their job situations, and responses were arranged on a seven-point scale ranging from very false (1) to very true (7). Rizzo et al. (1970) reported reliability estimates ranging from .78 to .82, and the instrument has been subject to extensive validation in the literature (Schuler, Aldag, & Brief, 1977).

Role overload is defined as the lack of adequate resources required to comply with role expectations or demands. A seven-item index obtained

TABLE 1
Scale Characteristics, Means, Standard Deviations, and Internal Consistency Reliabilities for All Variables in the Two Samples[a]

	Scale Characteristics		*Manufacturing Sample*			*Banking Sample*		
Variables	*No. of Items*	*Range*	*Mean*	*SD*	*Internal Consistency Reliability*	*Mean*	*SD*	*Internal Consistency Reliability*
Role conflict	8	8-56	32.15	7.56	.76	27.92	7.46	.74
Role ambiguity	6	6-42	16.76	4.15	.67	17.58	5.40	.78
Role overload	7	7-49	26.19	5.90	.73	26.60	6.33	.75
Job characteristics	15	15-105	83.89	9.80	.64	82.61	11.95	.73
Satisfaction with work	18	0-54	43.82	6.59	.69	41.50	8.81	.78

[a] $N=89$ and 81 for the manufacturing and banking samples, respectively. Reliabilities were obtained by applying the Spearman-Brown formula to the mean interitem correlation in each scale.

from previous research (Abdel-Halim, 1978; Beehr et al., 1976) was used to measure role overload. A sample of the items used in this index includes: "It often seems like I have too much work for one person to do" and "I often notice a marked increase in my work load." The items were rated on the same seven-point scale used in role conflict and ambiguity measures.

Job Design Characteristics—The five "core job dimensions" included in the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1975) were used to measure the degree of job scope or complexity. These dimensions include skill variety, task identity, task significance, autonomy, and feedback. Each of these job dimensions was measured by a three-item index and internal consistency reliabilities (Spearman-Brown formula) ranged from .62 (task identity) to .78 (feedback) in the manufacturing sample; the range was .48 (task significance) to .83 (feedback) in the banking sample. The five job dimensions then were combined additively to form a summary measure of job complexity. Consistent with Hackman and Oldham (1976) and Schuler (1977c), low scores on this job complexity measure are descriptive of relatively *simple, low scope jobs* and high scores are indicative of relatively *complex, high-scope jobs.*

Job design or enrichment is concerned essentially with the motivational properties of different jobs in an organizational system as experienced or perceived by individual jobholders. Strategies aiming at increasing the motivational properties of the job often cut across different occupational groups as well as technological boundaries (Hackman & Oldham, 1976). Hence they are not constrained by the type of technology operated by the organization. The target of job design intervention is the individual job and not alteration of the essential characteristics of organizational technology. Hence it is assumed here that job design characteristics are relatively independent of the dominant or overriding technology of the organization.

Organizational Technology—As mentioned earlier, technology was operationalized according to Thompson's (1967) typology of long-linked and mediating technologies. Compared with other classification schemes of technology (Hickson, Pugh, & Pheysey, 1969; Meissner, 1969; Perrow, 1970; Woodward, 1965), Thompson's typology has advantages that make it suitable for use in this study. It not only has broader applicability and demonstrated validity (Aldrich & Herker, 1977; Mahoney & Frost, 1974; Rousseau, 1977), but it also uses the dominant or overriding technology of the organization (and relevant task environment) as a basis for classification. According to Randolph and Finch, for example, Thompson's typology "is applicable to many organization situations, and is operational for research purposes" (1977, p. 1133). Accordingly, long-linked technology is represented in the present study by the manufacturing sample, and mediating technology is represented by the banking sample. Even though the manufacturing organization was involved primarily in the production and distribution of mostly standardized equipments used in agriculture and industry, only the production units that exhibited the essential characteristics of assembly line operations or were closely related to such operations were included in the sample. Most of the jobs were located, therefore, within or close to the core technology of the operations and away from external boundary-spanning roles.

Satisfaction with Work—This variable was measured by the 18-item satisfaction with work itself scale taken from the Job Descriptive Index (JDI) developed by Smith, Kendall, and Hulin (1969). The validity and reliability of the JDI have been well established in the literature (Imparato, 1972; Smith et al., 1969).

Analytical Procedure

Analysis of variance (ANOVA) was used to test the hypothesis of the study. To construct the ANOVA design, the manufacturing and banking samples were used to represent two levels of technology. Job complexity, role conflict, role ambiguity, and role overload were divided into subgroups by dichotomizing each variable at the median point into two levels of low and high scoring groups. This procedure resulted in a $2\times2\times2$ design. Three repeated runs of ANOVAs were completed for combinations of each of the three role variables, job complexity, and technology. The dependent variable in all three runs was respondents' ratings of their satisfaction with work itself. The above ANOVA procedure has the advantage of forming different subgroups so that effects of independent variables can be explained unambiguously and the interpretation of significant interaction effects is facilitated by examining the relevant subgroup means, which neatly summarize all the required information (Valenzi & Dessler, 1978).

RESULTS

Because the two samples of the study showed some differences in demographic variables, the initial concern focused on the potential spurious effects of these variables on the relationships examined in the study. Hence, demographic variables were correlated with the other variables in the study and the results are shown in Table 2. Although some of the correlations are significant at the .05 level or better, the magnitude of the intercorrelations is generally low and, using Wilcoxon test, no significant differences ($T=35$, *ns*) in the *pattern* of correlations between the two samples are obtained. It does not seem likely, therefore, that the observed demographic differences between the two samples will seriously influence the results pertaining to the hypothesized relationships.

Additionally, role conflict and satisfaction with work are negatively related ($r=-.33$, $p<.01$ and partial $r=-.29$, $p<.01$, holding the other two role variables constant) in the manufacturing sample, but unrelated in the

TABLE 2
Correlations Between Demographic and Major Study Variables in the Two Samples[a]

	Manufacturing Sample			*Banking Sample*		
Variables	*Age*	*Education*	*Job Tenure*	*Age*	*Education*	*Job Tenure*
Role conflict	−.27**	.26*	−.16	.06	.18	−.02
Role ambiguity	−.15	.14	−.05	−.21*	.14	−.24*
Role overload	−.13	.23*	−.01	.06	.00	.15
Job complexity	.04	−.10	.12	.18	.08	.21*
Satisfaction with work	.12	.11	.16	.20	.22*	.02

[a] $N = 89$ and 81 for the manufacturing and banking samples, respectively.
*$p < .05$
**$p < .01$

banking sample. Similarly, role ambiguity is negatively related to the satisfaction measure ($r = -.39$, $p < .01$ and partial $r = -.36$, $p < .01$) in the manufacturing sample as well as in the banking sample ($r = -.27$, $p < .05$ and partial $r = -.26$, $p < .05$). Role overload is not correlated with satisfaction, however, in either sample. These results indicate that the pattern of relationships is essentially the same for zero-order and second-order partial correlations and that role ambiguity makes the greatest contribution to the variance of the satisfaction measure in both samples. Further, role conflict correlated .12 and .40 with role ambiguity and role overload, respectively, and the correlation was .02 between the latter variables in the manufacturing sample; in the banking sample, role ambiguity correlated .11 with role overload and the two correlated .22 and .38, respectively, with role conflict.

To test the hypothesis of the study, three 2 × 2 × 2 fixed effects ANOVAs with satisfaction with work as the dependent variable were performed. Because categorization of respondents into the eight cells of the design created unequal sample sizes, an unweighted means analysis was employed to maintain the orthogonality of the independent variables. The ANOVA summary is shown in Table 3. As predicted, the three-way interactions of each of role ambiguity and role overload, job complexity, and technology are statistically significant ($F = 5.44$, $p < .02$ and $F = 5.73$, $p < .01$, respectively). However, the three-way interaction of role conflict, job complexity, and technology is not significant, nor is any of the two-way interactions.

Because the hypothesis of the study suggests directionality of effects, the cell means for the significant three-way interactions were examined and plotted graphically in Figure 1. Scheffé tests (Winer, 1971) were performed to determine significant differences in the means of relevant categories. The results in Figure 1 clearly support the hypothesis. In a long-linked (manufacturing) technology organization, individuals on simple, low-complexity jobs report significantly ($p < .025$) lower satisfaction with work when they experience high rather than low role ambiguity ($\overline{X} = 39.52$

TABLE 3
Three-Way Analysis of Variance Among Role Variables, Job Complexity, and Organizational Technology with Work Satisfaction[a]

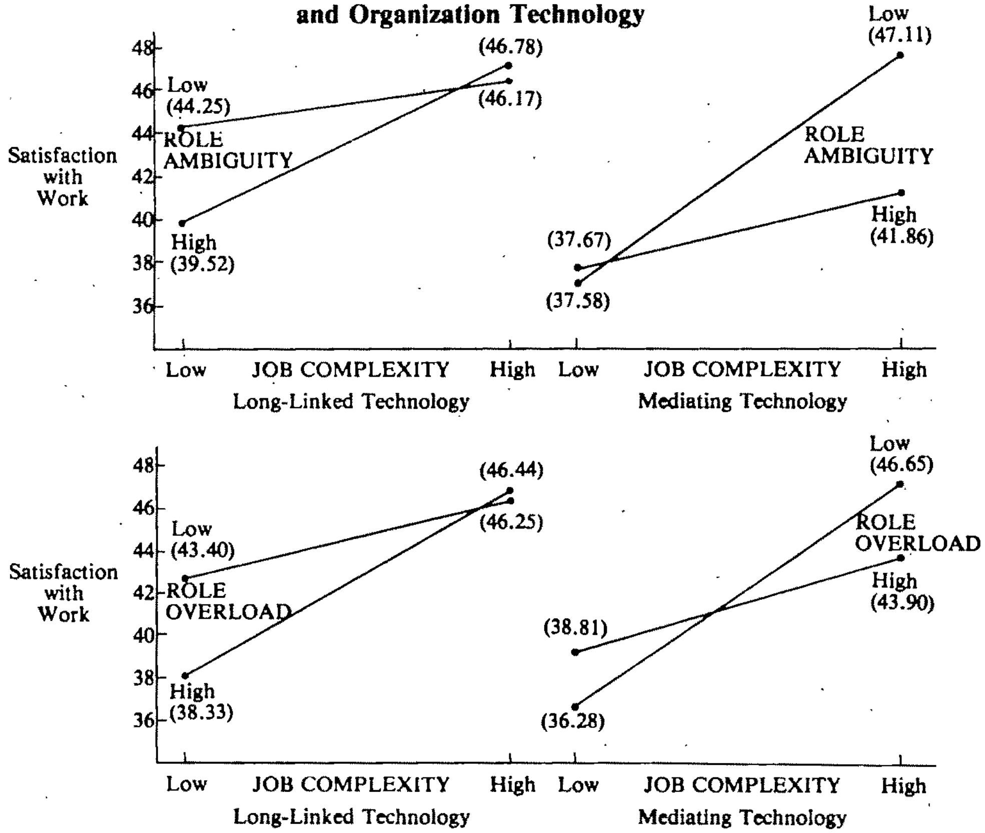
		Role Conflict		*Role Ambiguity*		*Role Overload*	
Sources of Variation	*DF*	*SS*	*F*	*SS*	*F*	*SS*	*F*
Main effects:							
A	1	277.56	5.62*	219.18	4.54*	89.66	1.84
B	1	1633.68	33.11**	1129.21	23.42**	1698.60	34.89**
C	1	231.81	4.69*	208.22	4.32*	230.55	4.73*
Interaction effects:							
A×B	1	6.22	<1.00	.86	<1.00	.09	<1.00
A×C	1	40.85	<1.00	3.07	<1.00	54.88	<1.00
B×C	1	43.14	<1.00	46.22	<1.00	40.84	<1.00
A×B×C	1	2.44	<1.00	262.10	5.43*	279.09	5.73**
Residual	157	7746.76		7569.36		7642.70	

[a] A = role conflict, ambiguity, and overload, respectively, for repeated ANOVA runs as shown in the right-hand columns; B = job complexity; C = technology. Degrees of freedom of the error term are lower due to missing data.

*$p<.05$

**$p<.01$

FIGURE 1
Significant Interactions Among Role Variables, Job Complexity, and Organization Technology



and 44.25, respectively) and when they experience high rather than low role overload ($\bar{X}$=38.33 and 43.40, $p<.01$, respectively). Similarly, in a mediating (service) technology organization, the work satisfaction of employees on highly complex jobs is significantly ($p<.01$) lower under high rather than low role ambiguity ($\bar{X}$=41.86 and 47.11, respectively), and the difference in satisfaction with work approaches significance ($p<.10$) for high and low role overload conditions ($\bar{X}$=43.90 and 46.65, respectively). Finally, as hypothesized, none of the differences in satisfaction with work scores is significant for employees on complex jobs in long-linked technology under high as compared with low levels of role ambiguity ($\bar{X}$=46.78 vs. $\bar{X}$=46.17) or role overload ($\bar{X}$=46.44 vs. $\bar{X}$=46.25). Similarly, no significant differences in work satisfaction scores are obtained for employees on simple jobs in mediating technology under high vis-à-vis low levels of role ambiguity ($\bar{X}$=37.67 vs. $\bar{X}$=37.58) or role overload ($\bar{X}$=38.81 vs. $\bar{X}$=36.28).

DISCUSSION

The most important finding of this study is the significant three-way interactions of each of role ambiguity and role overload, job complexity, and technology. The results support the rationale that employees on simple, low-scope jobs in long-linked technology and on complex, high-scope jobs in mediating technology are most vulnerable to the adverse consequences of role stress, and those on complex jobs in long-linked technology or on simple jobs in mediating technology seem to be unaffected by the levels of role variables. This rationale and the supportive results reported here provide a sound basis for the reconciliation of the seemingly inconsistent findings of previous research (Abdel-Halim, 1978; Beehr, 1976; Keller et al., 1976; Miles & Perreault, 1976; Tosi, 1971). The results tend also to extend recent research findings reported by Schuler (1977c) and Moch et al. (1979) suggesting that low levels of role variables are consistent with simple jobs in less complex technology and complex jobs in more complex technology. Hence high levels of role stress under these conditions would be disturbing and dissatisfying for role incumbents. Apparently the type of dominant technology incorporated by the organization is an important factor to consider in any attempts to determine how employees on simple vis-à-vis complex jobs may be affected by role stress variables.

Long-Linked and Mediating Technologies

In a highly buffered, serially interdependent, long-linked technology organization, employees on simple, low-scope jobs may not be readily able to deal *directly* with the different, conflicting, or unclear role demands or expectations of their role-set members. This is probably because of their lack of autonomy or discretion (Abdel-Halim, 1968; Beehr, 1976) and their high dependence on others (e.g., peers and superiors) in dealing with work problems, which makes it difficult for them to use such coping behaviors as avoidance or withdrawal, if necessary, to reduce the strain associated with role stress (Kahn et al., 1964). Hence, these individuals may become disturbed and dissatisfied when faced with ambiguous work demands or high work loads. It is noteworthy in this regard that it is the ***high*** rather than low levels of role variables that have significantly stronger effect on the explained variance in employee work satisfaction as the level of job complexity varies from low to high in long-linked technology ($\bar{X}=39.52$ vs. $\bar{X}=46.78$, $p<.01$ for *high role ambiguity* and $\bar{X}=38.33$ vs. $\bar{X}=46.44$, $p<.01$ for *high role overload*) (see Figure 1).

In a mediating (banking) technology organization, on the other hand, people often are involved in external boundary-spanning activities, functioning as information processors and filters (Aldrich & Herker, 1977), as representatives of the organization, and as formal or informal agents of the organization who influence the customers or clients (Parkington & Schneider, 1979; Thompson, 1967). Although formally required to operate with the bureaucratic techniques of categorization and impersonality in the application of rules and procedures (Thompson, 1967), employees of a commercial bank, reflecting their client orientation (Aldrich & Herker, 1977), often perceive themselves as being client-centered in their service orientation (Parkington & Schneider, 1979). This was found to be a major source of stress and dissatisfaction for commercial bank employees (Parkington & Schneider, 1979), especially those on complex jobs because they are the ones who often are involved in boundary-spanning activities and can exercise greater discretion and personal judgment on their jobs, perhaps at times in defiance of formal work rules.

Additionally, as Adams (1976) noted, the ability of individuals in boundary-spanning roles to control and manipulate expectations and pressures coming from external sources is often more limited than their ability to control, manipulate, and influence expectations and pressures coming from within the organization. Employees on complex jobs in mediating technology are likely, therefore, to face service role requirements involving relatively high risk and excessive or "chronic" stress (Miles & Perreault, 1976) for which there appear to be substantial health costs (Caplan & Jones, 1975; Cobb, 1974; House, 1974). Hence, experiencing low levels of role ambiguity and overload (perhaps through greater adherence to the organization's rules) would be a source of relief and satisfaction for these individuals on the job. The results in Figure 1 support this argument. It is the *low* rather than high levels of role variables that have significantly stronger effect on the explained variance in employee work satisfaction as the level of job complexity varies from low to high in mediating technology ($\bar{X}=37.58$ vs. $\bar{X}=47.11$, $p<.01$ for *low role ambiguity* and $\bar{X}=36.28$ vs. $\bar{X}=46.65$, $p<.01$ for *low role overload*).

Conclusions and Implications

Because technology appears to be an important factor that may influence the pattern of role stress-job design interaction, further attempts to investigate two-way interactions between these variables may not be very fruitful. Additionally, careful attention should be given to technological differences among organizations from which sampling pools are taken for role stress-job design research. In particular, sampling strategies that pool together respondents from different (technology) organizations, although perhaps adequate for job design research (Hackman & Oldham, 1975, 1976), are inappropriate for research involving role stress-job design interactions. Further, because previous research indicates that certain individual difference variables tend to influence the manner in which individuals respond to job design characteristics (Abdel-Halim, 1979; Hackman & Oldham, 1976; Wanous, 1974) as well as role stress variables (Beehr et al., 1976; Johnson & Stinson, 1975), the potential impact of these variables on the relationships examined here needs to be explored in future research.

The implications of the present findings for administrators are obviously important. They suggest that job characteristics—which can be changed through organizational decisions—affect the manner in which individuals react to and deal with role stress depending on the type of technology operated by the organization. Although organizational strategies aiming at increasing the level of job complexity or enrichment in a long-linked (manufacturing) technology organization may not be greatly influenced by role stress factors, the same job redesign strategies in a mediating (service) technology organization need to pay much attention to these stress factors because they appear to be strongly associated with employees' responses on the job. In other words, organizations with different technologies may benefit variably from a job redesign (or enrichment) program depending on the level of role stress characteristic of the technology. An assessment of the level of role stress variables, especially in mediating (service) technology organizations of the kind examined here, is therefore needed before a job redesign program is adopted. Similarly, administrators in these organizations need to monitor the potential impact of such a program on the levels of different role stressors in order to keep them within acceptable limits.

In conclusion, this study points out the importance of organizational technology in determining the manner in which role variables and job design characteristics may interact. Replication and extension of the results are certainly needed. In particular, future research needs to explore the specific factors in different technologies together with organizational structure (Moch et al., 1979; Schuler, 1977c) that influence how individuals on simple vis-à-vis complex jobs cope with stressful demands on the job. Because other typologies of technology—for example, Meissner, 1969, and Perrow, 1970—are available in the literature, future research should attempt to extend the validity of the present findings using a different typology of technology. This study has added insight, however, into the need to incorporate in role stress and job design models a macro variable such as organizational technology.

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Departmental Context and Formal Structure as Constraints on Leader Behavior[1]

JEFFREY D. FORD
Indiana University

An empirical investigation was made of the effects of size, personnel education, task routineness, workflow interdependence, environmental uncertainty, and formal structure on the behavior of leaders. Task routineness, personnel education, and environmental uncertainty were found to influence leader initiating structure; size and personnel education had a significant relationship to leader consideration.

Much of the research on leadership focuses on ascertaining the relationship between aspects of leader behavior (e.g., initiating structure) and various criterion variables (e.g., satisfaction) irrespective of the situation or the environment in which the situation is located. The implicit assumption guiding this research is that some form of leader behavior or style has an influence on the criterion variable(s), whereas situational or environmental characteristics have little or no influence (Kerr & Slocum, in press; Osborn & Hunt, 1975). Such an assumption is evidence in the vertical dyad linkage model of leadership (Graen, Dansereau, & Minami, 1972; Dansereau, Cashman, & Graen, 1973).

Contingency approaches to leadership (Fiedler & Chemers, 1974; House, 1971; Kerr, Schriesheim, Murphy, & Stogdill, 1974), however, call into question the validity of this assumption by suggesting that leader effectiveness is contingent on the alignment between the situation and the behavior the leader exhibits. The better the "fit" between situation and behavior, the more effective the leader. Thus, the situation influences the consequences of leader behavior.

Although situational approaches recognize that the consequences of leader behavior are influenced by the situation, they give little attention to the antecedents of leader behavior. Accordingly, there has been little research that examines the influence of the environment or context in which leadership occurs on the style or behavior of leaders. Evans (1978), for example, indicates that little is known about the influence of organizational characteristics (e.g., structure) on leader behavior. In this respect, the assumption is made that leaders either bring a given style to a situation (Fiedler & Chemers, 1974) or their choice of style is not significantly influenced by such context or environment factors as organization structure. Thus, for example, two leaders confronted with identical situations, one in an organic structure and the other in a mechanistic structure (Burns & Stalker, 1961), are assumed to engage in the same behavior. Osborn and Hunt (1975), however, question this assumption.

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[1] The author thanks the reviewers of this article for their many helpful comments.

In their adaptive-reactive theory of leadership, Osborn and Hunt (1975) argue that leader behavior is comprised of both an adaptive and reactive component. The adaptive component pertains to leader behavior that is externally determined or constrained by organizational factors (e.g., structure), and the reactive component pertains to the discretionary behavior responsive to the wants, needs, and pressures of subordinates. Accordingly, the behavior a leader exhibits is influenced by subordinate situations (reactive) as well as by organizational characteristics (adaptive). Moreover, the greater the constraint placed on a leader's behavior by organizational factors, the greater the adaptive component and the less the leader's discretionary or reactive component. This suggests that both the situation and the environment in which the situation occurs will influence leader behavior and that leaders confronted with different organizational environments (antecedents) will display different behaviors.

That leadership environments influence leader behavior is of considerable importance to the study of leadership. On the one hand, the influence of environmental factors may account for the lack of consistency and the low levels of explained variance observed in extant research (Stogdill, 1974; Kerr, 1976; Osborn & Hunt, 1975; Korman, 1966). On the other hand, if context factors sufficiently determine leader behavior, then the inclusion of the leader's behavior as an explanatory variable in that situation and environment is reduced significantly because of redundancy with the environmental factors. Thus, the extent to which context factors determine, constrain, or delimit leader behavior is the extent to which leader behavior need not be considered in explaining variations in criterion variables. Rather, one need only assess the relationship between context and criterion variables. For this reason, the antecedents of leader behavior are central to the understanding of leader behavior.

Given these considerations, the purpose of the present research is to identify empirically those context factors that are related to leader behavior and the extent and nature of that relationship. More specifically, this research seeks to identify the relationship between leader behavior and the organizational factors of size, technology, personnel education, workflow interdependence, environmental uncertainty, and formal structure. These context factors are selected both because they have been identified as potentially important constrainers of leader behavior (Kerr & Slocum, in press; Osborn & Hunt, 1975) and because they are considered the most significant organization factors in other literatures (Ford & Slocum, 1977). In this latter respect, their use provides some comparability with previous research findings.

In order to specify hypotheses to be tested, two assumptions are made. First, it is assumed that the organizational characteristics identified above are substitutes for leadership and that leader behavior will be constrained accordingly. This assumption is made necessary because, although the adaptive-reactive theory acknowledges environmental constraints, it does not indicate under what conditions or in what directions these constraints will occur. Kerr and Slocum (in press), however, suggest that the extent to which such organizational factors serve as substitutes for leadership will influence the extent to which they will influence leader behavior. The second assumption is that leaders are effective. Without these assumptions, it is not possible to specify, a priori, relationships between organizational factors and leader behavior.

HYPOTHESES

Size

With more subordinates to supervise per unit of time, leaders may find it more difficult to maintain high or even existing levels of personal contact. Consequently, they are likely to give less attention to subordinates' needs and feelings, i.e., less consideration, as the opportunity for such behavior is reduced. In addition, the increased interactions associated with increased size contribute to greater portions of a leader's time being given over to exceptions handling, information processing, and unit integration with other organization units. Consequently, the amount of time a leader has available for structuring behavior will be less. Moreover, the nature of the roles to be defined are likely to be more complex (Ford & Slocum, 1977), thus making the structuring of those roles more difficult and time consuming. In this respect, increases in size are likely to make structuring behavior more problematic, complex, and time consuming.

> Hypothesis 1: *Increases in size will be inversely related to leader structuring behavior and consideration.*

Personnel Education

With respect to personnel education, research evidence indicates that the greater the qualifications of personnel, e.g., professionalism, the lower the level of structure (Hage & Aiken, 1969; Hall, 1972). The lower level of structure stems from giving professionals greater control and discretion over the tasks they perform. In this respect, personnel education serves as a substitute for leader behavior (Kerr & Slocum, in press). Therefore, leaders of highly qualified personnel would be expected to display lower levels of structuring behavior. Consideration, on the other hand, may increase with personnel qualifications, as leaders attempt to provide the necessary support, both information and resource, to professionals.

Hypothesis 2: *Increases in the level of personnel education will be inversely related to leader initiating structure, but positively related to consideration.*

Technology

Technology, particularly in terms of its routineness, also has been suggested as a significant antecedent to leader behavior (Fiedler & Chemers, 1974; House, 1971; House & Dessler, 1974). According to Kerr at al. (1974) and Osborn and Hunt (1975), routine technologies act as a substitute for leader structuring behavior by restricting the leader's discretionary influences and available range of behaviors. At the same time, routine technologies, because they lack variety, are likely to be low in their ability to provide intrinsic sources of satisfaction. Thus, higher levels of leader consideration behavior are likely to occur in an attempt to compensate for these low levels of intrinsic satisfaction (Kerr et al., 1974; Miles & Petty, 1977).

Hypothesis 3: *Increases in the level of technology routineness will be inversely related to leader initiating structure, but positively related to consideration.*

Workflow Interdependence

In addition to routineness, workflow interdependence is an important dimension of technology that may have an influence on leader behavior. As interdependence increases, coordination requirements become more acute, suggesting a need for increased leader structuring behavior. Van de Ven, Delbecq, and Koenig (1976), however, found that increases in interdependence were associated with only slight and insignificant increases in the use of hierarchical (superior-subordinate) coordination methods. Rather, there was a greater reliance on group coordination modes such as scheduled and unscheduled meetings, i.e., leader substitutes. By the same token, as interdependence increases, there are likely to be more problems occurring as a result of interfacing the respective participants. Under these circumstances, the leader may have to be more supportive of the various personnel, facilitate their problem solving, and reduce interpersonal tension through increased consideration.

Hypothesis 4: *Increases in the level of workflow interdependence will not be significantly related to leader structuring behavior but will be positively related to consideration.*

Environment

There appears to be some consensus among researchers that perceptions of the environment are more closely related to how managers relate to their environment than they are to objective measures, although there are some measurement problems. In particular, it is the perceived uncertainty of the environment that has attracted significant attention (Ford & Slocum, 1977). Although environmental uncertainty per se has not been considered in leadership studies, research on role ambiguity (which seems to parallel the concept of environmental uncertainty) and leader behavior suggests that structuring behavior will increase with increased uncertainty (Kahn, Wolfe, Quinn, & Snoek, 1964).

As House (1971) indicates, ambiguity is characterized by the absence of clear path goal relationships. This same absence is seen in current measures of environmental uncertainty (Duncan, 1972; Lawrence & Lorsch, 1967). Under conditions of ambiguity, House indicates that leaders will initiate structure so as to reduce roadblocks and pitfalls confronting subordinates and, thereby, clarify path goal relationships. Leaders also are likely to increase their consideration behavior in an attempt to reduce job related tension and anxiety associated with increased uncertainty (Kahn et al., 1964; Miles & Petty, 1977).

> Hypothesis 5: *Increases in perceived environmental uncertainty will be positively related to leader structuring behavior and consideration.*

Formal Structure

Formal structure may act as a substitute for leader structuring behavior by reducing "subordinate's structuring needs almost to zero" (Kerr et al., 1974, p. 75). This results from the definition and clarification of roles provided by formal structure, particularly through rules and the hierarchy of authority. Consequently, high levels of rules and the hierarchy of authority are likely to reduce levels of initiating structure. At the same time, however, the formal structure will increase levels of consideration as leaders attempt to meet individual needs not satisfied by the impersonal, formal structure.

> Hypothesis 6: *Increases in formal structure will be inversely related to leader structuring behavior, but positively related to consideration.*

METHOD

Setting and Sample

The setting for the present research was a book publishing company, a bank branch, and a university located in an urban area of a midwestern state. These organizations differ in terms of their dominant technologies—long linked, mediating, and intensive, respectively (Thompson, 1967). It thus was felt that they would have sufficient variation in task types and dimensions that the influence of technology could be ascertained. By the same token, it was felt that the nature of their respective environments would be sufficiently different to provide the necessary variation on this dimension. Finally, given the research evidence relating structure to technology and environment (Ford & Slocum, 1977), it was felt that these three organizations would differ enough in structure that structural influence on leader behavior could be observed.

Numerous writers have indicated that departments within the same organization are likely to vary in terms of their structure (Hall, 1962), technology (Van de Ven & Delbecq, 1974), and environment (Lawrence & Lorsch, 1967). In this respect, Osborn and Hunt (1975) found differences in average leader behavior across 60 chapters of a professional business fraternity to be influenced by chapter size and environmental complexity. Accordingly, the three organizations in the present study were divided into identifiable departments defined as formally designated (by the respective organizations) functional units charged with a formally defined set of responsibilities directed toward the attainment of some basic objective and headed by a manager with decision making authority over that area. A total of 35 departments were identified.

Data were collected through questionnaires given to the department manager and all department members. Because the department manager provided information on department level environmental uncertainty, workflow interdependence, and formal structure and department members provided information on task routineness and leader behavior, only fully complete data from both the department manager and at least one-fourth of the department members were used. If either the manager's or members' data were not complete, the other's data were not used. In addition, only data from department members having at least one year tenure in their current position was used. The application of these criteria resulted in usable data from 25 department managers and 445 department members.

MEASURES

Size

Although there is some controversy as to how size should be measured (Kimberly, 1976), Child (1973) argues that because it is people who are organized, their number should have a close relationship to structure. Therefore, department size was measured as the total number of full-time personnel in the department.

Personnel Education

In the case of personnel education, department members were asked to indicate the highest level of formal education they had completed. Response categories ranged from 1 (high school or less) to 9 (Ph.D.).

Routineness

Task routineness was measured through the use of a scale administered to department members. This scale, derived from the technology scales of Lynch (1974) and Van de Ven and Delbecq (1974), measures the extent to which department members encounter exceptions in their work. It includes such items as: "What percent of your work is the same from day to day?" and "What percent of the work demands connected with your job would you consider to be of a routine nature?" Internal reliability (Cronbach alpha, 6 items) for this scale is .75. Possible scale scores range from 1 to 5 with higher scores indicating greater routineness.

Workflow Interdependence

To determine the level of departmental workflow interdependence, the department manager was asked to read a short description of the three interdependence types identified by Thompson (1967)—pooled, sequential, and reciprocal. The manager was then asked to indicate the percentage of employees in his/her department engaged *predominately* in each type of interdependence in their work relations. The manager was instructed that percentage allocations must total to 100 percent. Because Thompson (1967) argues that control and coordination costs increase with increased interdependence, it was felt that reciprocal interdependence should be given greater weight in an overall measure than sequential interdependence, which in turn should be given greater weight than pooled interdependence. Accordingly, a weight of 1 was given to pooled interdependence, 2 to sequential interdependence, and 3 to reciprocal interdependence. These weights then were multiplied by the corresponding percentage of employees engaged in work having predominately that type of interdependence, and these products were summed to give an overall interdependence measure. The higher the score (minimum = 1, maximum = 3), the greater the degree of interdependence.

Environment

Duncan (1972) argues that organizational subsystem environments are comprised of entities external to the subsystem but located either internal or external to the organization. It might be that departments have greater influence and/or control over sources of uncertainty internal to the organization and, therefore, may not deal with it in the same manner as uncertainty generated from sources external to the organization. Thus both sources of uncertainty are considered here.

To measure environmental uncertainty, Sathe's (1974) modified version of Duncan's (1971) perceived uncertainty scale was used. With this scale, the department manager is asked to identify entities either internal or external to the organization with which his/her department was directly involved in the process of carrying out its task. Once identifying the respective groups, the department manager was asked to specify the degree of certainty he/she has in (1) knowing the expectations of each group, (2) how to respond to those expectations, and (3) how often the expectations are met. Response categories ranged from 1 (always) to 5 (never).

In order to establish levels of both internal and external uncertainty, the department manager's responses were summed across each of the above three questions for each class (internal or external) of groups identified. These sums were then totaled separately for the internal and external groups and the totals divided by the number of groups comprising the internal or external set. These average scores then were used as indicators of internal and external uncertainty with higher scores indicating higher uncertainty. Internal reliability (Cronbach alpha) was .83 (3 items) for the internal scale and .81 for the external scale (12 items).

Formal Structure

As suggested previously, it is the department's rules and hierarchy of authority that are likely to influence leader behavior. Accordingly, two aspects of formal structure, both dealing with control, are considered—hierarchical control and formalization. Hierarchical control was measured with Samuel and Mannheim's (1970) hierarchy of control index. This index reflects the degree of cumulative authority and responsibility resting in various hierarchical levels. The higher the score (possible scores may range from 0 to 10), the narrower the spans of control, the greater the number of hierarchical levels, and the greater the level of authority resting in higher levels. In this respect, this measure serves as an indicator of centralization (Sathe, 1974). It should be noted that although initially used by Samuel and Mannheim to measure the hierarchy of control in organizations, the index itself is level free and thus may be used on units other than an organization.

Formalization was measured with Inkson, Pugh, and Hickson's (1970) formalization index. This index measures the extent to which rules, procedures, instructions, communications, etc., are codified and available to department members. Index scores may range from 0 to 9 with higher scores indicating higher levels of formalization. Both this index and that of hierarchical control were determined from data collected by questionnaire to the department manager.

Leader Behavior

The two dimensions of leader behavior considered here are initiating structure and consideration (Stogdill, 1974). Stogdill (1974) indicates that initiating structure reflects the extent to which the leader defines his/her role and lets subordinates know what is expected. Consideration, on the

TABLE 1
Intercorrelations and Summary Statistics of Measures

	Initiating Structure	*Consideration*	*Size*	*Personnel Education*	*Task Routineness*	*Workflow Interdependence*	*External Uncertainty*	*Internal Uncertainty*	*Formalization*	*Hierarchy of Control*
Initiating structure	—									
Consideration	.64	—								
Size	-.17	-.28	—							
Personnel education	-.23	-.33	-.31	—						
Task routineness	.52	.33	-.21	-.22	—					
Workflow interdependence	.04	.22	-.02	-.11	.27	—				
External uncertainty	-.13	-.21	.41	-.23	-.21	-.19	—			
Internal uncertainty	.05	-.15	.28	.12	-.08	-.14	.74	—		
Formalization	-.14	.04	.26	-.11	-.01	.18	.17	.17	—	
Hierarchy of control	-.06	-.01	-.15	.43	.24	.20	-.23	-.11	-.14	—
Mean	3.78	3.26	29.80	2.96	3.94	2.07	2.31	2.06	6.02	.89
Standard Deviation	.34	.28	28.27	1.37	.47	.50	.90	.72	1.52	1.33
Source[a]	E	E	M	E	E	M	M	M	M	M

[a] E = employees, M = manager.

other hand, refers to the extent to which leaders regard subordinate's well-being, status, comfort, and contributions. To measure these two dimensions, the leader behavior description questionnaire (LBDQ) Form XII was used. This questionnaire was administered to department members who were asked to rate their managers on these two dimensions. Internal reliabilities (Cronbach alpha) are .86 for initiating structure (10 items) and .90 for consideration (10 items).

Because this research is concerned with the influence of department level organizational factors on leader behavior, it was necessary to aggregate the responses of department members to get an average department level measure for each of leader initiating structure, consideration, personnel education, and routineness. Thus, $N=25$ for the subsequent analyses. Table 1 shows the intercorrelations of the measures, their means, standard deviations, and source.

RESULTS

To determine the influence of each context factor on leader behavior, multiple regression was used. The results are shown in Table 2. Although many of the directional relationships hypothesized are supported by the regression results in Table 2, the number of significant relationships is low (25 percent). In part, this may be the result of including several statistically nonsignificant context factors in the overall equation. Accordingly, a second multiple regression was performed wherein all the context factors were entered and then any context factor not significant at the .10 level was removed through a stepwise method. The results of this backward stepwise regression are shown in Table 3.

The regression results shown in Table 3 provide mixed support for the six hypotheses. The negative influence of size on consideration supports

TABLE 2
Summary of Overall Regression Results

	Leader Behavior	
Context Factor	*Initiating Structure*	*Consideration*
Size	-.06[a]	-.25
Personnel education	-.09	-.13*
Task routineness	.36**	.05
Workflow interdependence	-.08	.03
External uncertainty	-.24*	-.14
Internal uncertainty	.29*	.15
Formalization	-.03	.01
Hierarchy of control	-.02	-.02
Constant	3.03	3.64
F	1.90	1.27
R^2	.49	.39
α	.13	.32

[a] Regression coefficient.

*$\alpha \leq .10$

**$\alpha \leq .05$

TABLE 3
Most Significant Context Factors

	Leader Behavior	
Context Factor	*Initiating Structure*	*Consideration*
Size		$-.28^{**}$
Personnel education	$-.09^{*}$	$-.10^{**}$
Task routineness	$.33^{**}$	
External uncertainty	$-.23^{**}$	
Internal uncertainty	$.28^{**}$	
Constant	2.69	3.91
F	3.75	4.06
R^2	.43	.27
α	.02	.03

$^{*}\alpha \leq .10$
$^{**}\alpha \leq .05$

Hypothesis 1, whereas the absence of a significant influence of size on initiating structure does not. Although personnel education's negative influence on consideration supports Hypothesis 2, its negative influence on consideration does not. In fact, the influence of personnel education on consideration is opposite to the relationship hypothesized. Hypothesis 3 also is not supported in that task routineness has a positive, rather than the predicted negative, influence on initiating structure and no significant influence on consideration.

One reason for the failure to support Hypothesis 3 may be that both the leader behavior and task routineness measures were collected from the same respondents, i.e., same source bias. To test this possibility, each member within each department was randomly assigned to a leadership or technology group. An average was then computed for leader behavior using only the responses of the members assigned to the leadership group. Similarly, an average for task routineness was computed using only the responses of the members assigned to the task routineness group. These average measures of leader behavior and task routineness were then treated as the department level measures and used in the regression equations. This procedure produced no significantly different results, indicating that common respondent bias did not influence the relationship between task routineness and leader behavior.

As predicted in Hypothesis 4, workflow interdependence has no significant influence on leader initiating structure. The absence of a significant influence of workflow interdependence on consideration, however, does not support Hypothesis 4. With respect to Hypothesis 5, support for the influence of environmental uncertainty on initiating structure depends on the source of uncertainty. External uncertainty (outside the organization) decreases initiating structure, which is contrary to predictions, whereas internal uncertainty (outside department but inside the organization) has the predicted positive influence on initiating structure. Regardless of which measure is used, however, environmental uncertainty has no significant

TABLE 4
Summary of Hypotheses Tests

Hypothesis	Initiating Structure		Consideration	
	Predicted	*Found*	*Predicted*	*Found*
1 Size	–	0	–	–
2 Personnel education	–	–	+	–
3 Routineness	–	+	+	0
4 Workflow interdependence	0	0	+	0
5 Environmental uncertainty	+	∓[a]	+	0
6 Formal structure	–	0	+	0

[a] Negative for external; positive for internal.

influence on consideration. Finally, contrary to Hypothesis 6, neither formalization nor centralization has a significant influence on either leader initiating structure or consideration. Table 4 summarizes the results with respect to the six hypotheses.

DISCUSSION AND CONCLUSIONS

In summary, the results obtained here offer mixed support for the general proposition that department context and structure variables influence the behavior of departmental leaders. Moreover, the results indicate that initiating structure and consideration are not influenced by the same context and structure factors. Task routineness, personnel education, internal and external uncertainty are all significantly related to leader initiating structure, whereas only size and personnel education are significantly related to consideration. Workflow interdependence and formal structure are not significantly related to either initiating structure or consideration.

The results of this study indicate that initiating structure is more subject to context and structure influence than consideration. With respect to the adaptive-reactive theory of leadership, this finding suggests that leader initiating structure is the adaptive component and consideration is the reactive component.

Two of the more surprising findings are the relationship between leader initiating structure and task routineness and external uncertainty. Although the results obtained here are contrary to those expected, they do suggest an interesting possibility with respect to other research. In particular, numerous studies have found positive relationships between task routineness and perceptions of structure and negative relationships between external uncertainty and perceptions of structure (Ford & Slocum, 1977). If, as Bobbitt and Ford (1980) suggest, leaders are a significant factor in determining member perceptions of structure, then the relationships found here are consistent with those findings. In this respect, these results support the arguments of Bobbitt and Ford (1980) that decision makers moderate the relation between context and structure.

The nature of the relationship between leader behavior and task routineness, as well as the lack of significant relationships between leader behavior and formal structure, raises a conceptual issue that should be considered in subsequent research. That issue is the implicit assumption that the linkage between context factors and leader behavior is direct, necessary, and logical such that the behavior of the leader is so determined that discretion is removed (Bobbitt & Ford, 1980). In this respect, it must be assumed that leaders can diagnose and respond to context factors in only one way. The validity of such an assumption, however, is called into question by the findings of Lawrence and Lorsch (1967), among many others, who have found that managers in the same or nearly the same environments have different perceptions of those environments and behave differently. Mawhinney and Ford (1977) suggest that there are some situations that are so ambiguous that no one can know the situation, thereby reducing a leader's ability to know how to behave.

But even if the assumption that managers have similar perceptions of the situation and that their assessments are accurate is correct, it must then be assumed that they will cope with the situation in a similar fashion and that they know what that fashion is. Bourgeois, McAlister, and Mitchell (1977), however, found that naive managers responded to turbulent environments through mechanistic structures, whereas organic structures were designed in stable environments, a finding contrary to much research. Moreover, there is some evidence to suggest that how leaders cope with a given situation is a function of individual differences (MacCrimmon & Taylor, 1976; England, 1967; Bobbitt & Ford, 1980).

The point to be made here is that the linkage between context variables and leader behavior need not be direct, necessary, or logical. Indeed, the existence of ineffective leaders and the moderate amount of variance explained here is testimony to the absence of such a deterministic relationship. Rather, what linkages exist may depend on leader interpretations of the context and his/her beliefs about how to deal with it (Bobbitt & Ford, 1980). Thus, not all leaders will view the same factors as substitutes (Kerr, 1976). Clearly this is the case here. In this respect, although context factors *may* influence leader behavior, they do not eliminate leader discretion (Khandwalla, 1976). For this reason, consideration should be given to leader interpretations of the situation and an assessment made of their coping beliefs.

Similarly, it may be argued that the lack of a significant relationship between leader behavior and context factors is attributable to differences in leader effectiveness. That is, effective leaders are responsive to contextual factors, but ineffective leaders are not (or vice versa). Although effectiveness was not an issue in this research, it should be noted that such an explanation reinforces the proposition that organizational factors are not constraints per se, but that leaders interpret and diagnose their environments (some more correctly than others) and that if leaders are to be effective they must be able to diagnose correctly the environment and then use the appropriate behavior. Moreover, reliance on the role of effectiveness begs the question as to why ineffective leaders are ineffective. What factors influence their choice of leader behavior?

The lack of a significant relationship between leader behavior and the hierarchy of control raises other issues that deal with the extent to which structure and the associated structuring processes are controlled. Hrebiniak indicates that where organization control is fragmentary, as opposed to unitary, "the personal interpretations of existing administrative structure is an important aspect of leadership or supervision" (1974, p. 396). Under these circumstances, output, rather than method control (Ouchi & Maguire, 1975; Ouchi, 1977), may be utilized by higher management levels, giving leaders greater discretion over the methods they use. Accordingly, leaders may elect not to enforce the formal structure (Melcher, 1976) if they feel nonenforcement will facilitate task achievement. Selective enforcement and nonenforcement, however, would result in the lack of significant, as well as inconsistent relationships between leader behavior and formal structure among studies. Accordingly, it becomes necessary to ascertain a leader's commitment to the formal structure (an indicator of its potential enforcement) and the extent to which structuring behavior is controlled (output versus methods control) by higher management levels or the formal structure. Finally, since Meyer and Rowan (1977) indicate that formal structures may be created for purposes of legitimatizing the organization to its environment and have little to do with actual operating structures, a significant relationship between formal structure and leader behavior would not be expected. Thus, the degree of coupling (Weick, 1976) could influence relationships between leader behavior and formal structure. Again these issues remain for future research.

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Boundary Spanning Individuals: Their Role in Information Transfer and Their Antecedents[1]

MICHAEL L. TUSHMAN
Columbia University
THOMAS J. SCANLAN
Manhattan College

An investigation of alternative mechanisms by which information is imported into organizations indicates that informational boundary spanning is accomplished only *by those individuals who are well connected internally and externally. These key individuals are nominated as technically competent in their unit and have personal characteristics to link effectively their unit to external areas.*

A member of the laboratory's technical staff needs up-to-date marketing information. What does she do? She knows that the formal report system is not current and her last conversation with a marketing specialist was not productive.

A project leader in the development division needs to know the latest developments in fiberoptics for an upcoming report. Further, he has a journal article in a related technical area that he does not know how to interpret. Should he invest more time and money exploring this technology? Where will this project manager get this information and expertise?

Individuals in organizations are continuously called upon to make decisions without sufficient information. Given the unrelenting pace of organizational life, decision makers must be able to maximize their information acquisition at a relatively low cost in terms of time, energy, and effort (Arrow, 1974; Mintzberg, 1973). More generally, organizations must acquire timely information from a number of external areas; further, this information must be translated so that it is of relevance to the organization. How, then, are these individuals in particular and organizations more generally effectively linked to external areas?

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Information acquired via formal information media (e.g., MIS reports) is inherently dated, and formal information systems have only limited encoding capabilities (Gerstberger & Allen, 1968). Widespread direct communication across organizational boundaries is costly, inefficient, and prone to bias (Katz & Kahn, 1966; Wilensky, 1967; Allen, 1977). Informal social mechanisms, however, are an effective medium for acquiring and encoding timely, current, and soft information (March & Simon, 1958; Edstrom & Galbraith, 1977; Aldrich & Herker, 1977). The literature, however, is equivocal as to the nature of these information mechanisms linking organizations with external areas. Some research suggests that individuals with strong links to external areas provide external linkage (Leifer & Huber, 1977; Bacharach & Aiken, 1977; Miles, 1977; Keller & Holland, 1975). Others argue that a multistep process is required to link organizations to external areas (Pettigrew, 1972; Allen & Cohen, 1969; Schwartz & Jacobson, 1977; Tushman, 1977).

The present research distinguishes between external communication stars—those individuals with substantial boundary spanning activity (BSA)—internal communication stars, and those individuals who are both internal and external communication stars (boundary spanning individuals). It tests the extent to which each communication role links its unit to external sources of information. This research also investigates the antecedents of boundary role status, building on research that suggests that boundary spanning individuals are seen by their colleagues as technically competent and have the background and skills to communicate with different external areas (Blau, 1963; Tushman & Scanlan, 1981).

COMMUNICATION BOUNDARIES AND BOUNDARY SPANNING

As organizations evolve, specialized units are created to deal with relatively homogeneous tasks and with specific segments of the organization's task environment (for instance, marketing vs. R&D departments). Individuals with specialized skills and training are hired and socialized to attend to the unit's particular work requirements. Organizational boundaries, then, separate specialized subunits from each other and from external areas (Katz & Kahn, 1966).

Specialization and the existence of organizational boundaries are also associated with the evolution of local norms, values, and languages tailored to the requirements of the unit's work (March & Simon, 1958; Lawrence & Lorsch, 1967; Ritti & Gouldner, 1969). This specialization is a double-edged sword, for it increases the efficiency of information processing within the unit, but simultaneously creates obstacles to information processing between the unit and external areas. More specifically, organizational boundaries are associated with a communication boundary or impedance separating the unit from external areas. Communication boundaries are created by the interaction between (1) idiosyncratic language/coding schemes and (2) by the development of local conceptual frameworks.

Special technical languages evolve in units as members attend to their local work requirements (Arrow, 1974; March & Simon, 1958). Actors evolve a shared semantic space, which permits them to express large amounts of information with relatively few symbols (Randolph, 1978; Cherry, 1965; Allen, 1977). This specialization of both verbal and nonverbal language permits an economical transmission of information and minimizes misunderstandings between actors who share the language.

Because units have their own specialized semantics, it becomes necessary to recode at boundaries between units. The objective in this translation is to convert words into the second semantic space while retaining meanings held in the first. A loss of information, or semantic noise, is almost inevitable at each translation because words take on a richness of meaning that extends beyond simple associations to the full set of rules, habits, and conventions for the word's use (Bar-Hillel & Carnap, 1953; Parkinson, 1968). As an example, note the difficulty in communicating the meaning of an idiomatic expression.

Members of subunits also develop their own local social constructions of reality to help them define and interpret their social world (Berger & Luckman, 1966; Van Maanen & Katz, 1979). These collective beliefs provide rules (e.g., premises of decision making, levels of satisficing) by which actors can define and manage the unique and recurring problems of organizational life. These shared beliefs provide the context and rules with which information is processed. The meaning of an event or an expression, then, can only be inferred when both its context and content have been both enacted and encoded (Bateson, 1972; Watzlawick, Beavin, & Jackson, 1967). For example, note the contextual clues needed to encode accurately an ironic message.

Communication, then, is inherently ambiguous. The information content of a communication episode can only be ascertained by first registering and then encoding the equivocality of the message (Cherry, 1965; Weick, 1969). The interaction of local languages and local conceptual schemes make consistent enactment and encoding problematic. Communication across boundaries, therefore, is difficult and prone to bias and distortion. The greater the language/cognitive differences, the greater the communication impedance (March & Simon, 1958; Miles, 1977; Katz & Kahn, 1966; Simon, 1979; Dearborn & Simon, 1958).

Boundary Spanning as a Two-Step Process

Someone learning a new language must learn both the vocabulary and how to interpret contextual messages—that is nonverbal signs, intonations of voice, the use of space (Watzlawick et al., 1967). Similarly, communicating across organizational boundaries requires learning the local coding schemes and languages as well as the specialized conceptual frameworks. Boundaries can be spanned effectively only by individuals who understand the coding schemes are attuned to the contextual information on both sides of the boundary, enabling them to search out relevant information on one side and disseminate it on the other. Informational boundary spanning, then, must be a two part process; obtaining information from outside units and disseminating this information to internal users.

Much of the literature on boundary spanning identifies and investigates only one component of this two part process. The research on BSA focuses on those individuals who have strong linkages outside the organization (Keller & Holland, 1975; Leifer & Huber, 1977; Adams, 1976; Miles, 1977; Bacharach & Aiken, 1977). Although these individuals may represent the organization externally (e.g., salesmen), there is no evidence that these external communication stars actually import information (Von Hippel, 1976). What is frequently referred to as boundary spanning may be simply external activity with little information disseminated within the organization; indeed, these individuals are frequently internal isolates (Roberts & O'Reilly, 1979; Allen, 1970).

Other research has focused on internal communication stars (Whitley & Frost, 1973; Frost & Whitley, 1971; Allen & Cohen, 1969; Baldridge & Burnham, 1975; Tushman, 1977). This research has inferred that internal stars also link their colleagues to external areas. These individuals may or may not be strongly linked externally. Indeed, research by Tushman and Scanlan (1981) found that some internal stars were locally oriented (not strongly linked externally) and others were more cosmopolitan.

Internal linkage and external linkage are necessary but not sufficient conditions to perform an informational boundary spanning function. Informational boundary spanning will be accomplished *only* by those individuals who are well connected to external information areas and who also are well connected internally and thus able to disseminate new information and new ideas to their more locally oriented colleagues. These ideas suggest several hypotheses:

> *Hypothesis 1: There will be a positive association between being chosen as a valuable source of new information and ideas and being a boundary spanning individual.*
>
> *Hypothesis 1A: There will be no association between being an internal or external star and being chosen as a valuable source of new information and ideas.*

Is informational boundary spanning more than a function of formal status? Formal position facilitates both internal and external communication, but it may or may not be associated with boundary role status (Katz & Tushman, 1979). Research from several disciplines suggests that perceived work-related competence is a more basic determinant of boundary role status than formal position. Technical competence, partly a function of information access internally and externally, stimulates internal consultation and may lead to a promotion. Thus although there will be overlap between formal position and boundary role status, informational boundary spanning is not a function of formal position (Blau, 1963; Tushman & Scanlan, 1981).

Hypothesis 2: For nonmanagerial personnel, there will be a positive association between being chosen as a valuable source of new information and ideas and being a boundary spanning individual.

What are the antecedents of informational boundary spanning? Boundary spanning individuals must be well connected internally and externally. Previous research indicates that perceived work-related competence is a primary determinant of internal consultation; people will approach those whom they see as competent, independent of formal status (Spekman, 1979; Blau, 1963). Perceived technical competence may lead to a promotion, which in turn would facilitate both internal and external linkages. These ideas indicate that both formal status and perceived technical competence are primary determinants of internal consultation, but perceived competence is the more basic determinant (Tushman & Scanlan, 1981).

Hypothesis 3: There will be a positive association between being an internal communication star and being nominated as technically competent. This association will not exist for external stars.

Hypothesis 3A: Perceived technical competence will be a stronger determinant of internal star status than formal position in the hierarchy.

Boundary spanning individuals also must be able to communicate effectively with external areas; they must be able to understand the languages and conceptual frameworks of individuals outside their unit (for example, areas in the larger organization or areas outside the organization). To communicate effectively with external areas, external communication stars must have the background, experience, and training to deal with the communication impedance separating his or her unit from external areas. Because subunits face several relevant external areas, external stars will have different characteristics to meet the information requirements of each distinct area (Tushman, 1977; Katz & Tushman, 1979).

Hypothesis 4: External stars will have specialized characteristics to match information requirements of distinct external areas.

Informational boundary spanning, then, is a two-part process: obtaining information from external areas and disseminating that information to internal users. The ability of an individual to span a boundary is predicated on his/her having the work-related expertise required to communicate effectively on both sides of the communication boundary.

METHOD

This study was conducted in the research and development (R&D) division of an American high-technology medical instrument corporation. This laboratory was divided into four departments and employed 210 professionals. Secretarial and nontechnical personnel were excluded from this study.

Technical Communication

To provide communication data, individuals were asked to report their actual, work-related, oral communication for a number of selected days (respondents were asked not to report strictly social communication, nor were they to report written communication). These data were collected once a week for five weeks (an equal number of each of the weekdays was chosen). The overall response rate was 74 percent. Moreover, 81 percent of all communication reported within the laboratory was mentioned by both parties. See Tushman (1977) or Weiss and Jacobson (1960) for comparative data. Extra-laboratory data were self-report data that could not be corroborated with discussion partners.

The department was chosen as the unit of analysis, and three distinct communication roles were identified: internal stars, external stars, and boundary spanning individuals. Internal communication stars, identified for each department, were defined as those individuals who engaged in more than one standard deviation above the mean number of intra-departmental communications (as reported by their peers). Three external areas were identified: one within the organization and two outside. The intra-organizational area included other areas within the corporation (for instance, marketing or manufacturing). The two extra-organizational areas were (1) professional areas (universities and/or professional societies) and (2) operational areas (suppliers, vendors, or customers). External stars for each area were defined as those individuals in the top fifth of the extra-department communication distribution. (The extra-departmental communication distributions were highly skewed. Many individuals had no communication with external areas, and a few had substantial external communication. Thus a one standard deviation rule could not be used. The top fifth criterion provided for approximately equal numbers of external stars for each area.) Finally, boundary spanning individuals were defined as those individuals who were both internal and external communication stars.

Demographic Data and Peer Nominations

Approximately 75 percent of the professional staff responded to a questionnaire which asked (among other things): tenure (number of years in the division); education (highest degree earned); papers (number of papers published or presented in the past five years); hours reading (average number of hours per week spent reading professional literature); and status (position in the divisional chain of command). Status has an inverted scale, ranging from 1 = vice president to 6 = entry level employee. The ranges for the other variables were: tenure (0-24 years), education (1 = did not complete high school to 6 = Ph.D.), papers (0-15 papers), and hours reading (0-12 hours).

To gather data on perceived technical competence, each individual was asked to nominate those "who are the most technically competent people in your department." The distribution of nominations per individual was highly skewed (two thirds of the individuals had one or fewer nominations). Individuals were categorized as technically competent if nominated by two or more individuals ($N = 75$).

Individuals also were asked to nominate those in their department "whom you consider to be valuable contacts for external information, new ideas, and critical evaluation." This distribution also was highly skewed; individuals were categorized as valuable sources of new ideas and information if they were nominated by two or more individuals ($N = 91$).

Finally, each individual was asked to indicate how he/she developed contacts with each of the four external areas. The categories, based on Granovetter's (1973) work, were: formal channels, previously worked together, attended the same school, were neighbors, via mutual acquaintance, and others. The last four categories were combined as they were chosen infrequently.

RESULTS

Hypothesis 1 is based on the idea that informational boundary spanning is a two-part process; obtaining information from external sources and disseminating information to internal users. It was predicted that there would be a positive association between being a boundary spanning individual and being chosen as a valuable source of new information and ideas.

In support of Hypothesis 1, there is a positive association between being nominated as a valuable source of external information and new ideas and being a boundary spanning individual. This positive association, however, does not exist for either internal stars or external stars (Table 1). Furthermore, the absolute number of nominations as sources of new information and ideas for each communication role are significantly different (Kruskal Wallis ANOVA; $p < .001$). Boundary spanning individuals have about twice the number of nominations as do internal stars and almost three times the number of nominations as do external stars. There then is strong support for Hypothesis 1. Those who are nominated as valuable sources of new information and ideas are *both* internal and external stars. Neither internal stars nor external stars are nominated as valuable sources of new information by their peers.

The second hypothesis reasons that boundary spanning is not simply a function of formal status; that nonmanagerial boundary spanning individuals would be seen by their colleagues as more valuable sources of new information and ideas than would nonmanagerial internal or external stars. Of the boundary spanning individuals, 32 percent (7 out of 22) were also supervisors. After eliminating these individuals, there still is a strong association between boundary spanning position and being nominated as a

TABLE 1
Individuals Nominated as "Valuable Sources of External Information and New Ideas" and Communication Roles

A. Boundary Spanners

	Boundary Spanners	*Nonspanners*	*Total*
Valuable sources	19	72	91
Unnamed	3	110	113
Total	22	182	204

$X^2=15.558$ $p<.001$
Contingency Coefficient $=.27$[a]

B. Internal Stars—excluding Boundary Spanners

	Stars	*Nonstars*	*Total*
Valuable sources	8	64	72
Unnamed	7	103	110
Total	15	167	182

$X^2=1.342$ $p=$ N.S.
Contingency Coefficient $=.08$

C. External Stars—excluding Boundary Spanners

	Stars	*Nonstars*	*Total*
Valuable sources	31	41	72
Unnamed	36	74	110
Total	67	115	182

$X^2=2.000$ $p=$ N.S.
Contingency Coefficient $=.10$

[a] Upper limit for 2×2 contingency coefficient is .71.

valuable source of new information and ideas (Table 2). Similarly, nonmanagerial boundary spanners are nominated as valuable sources of new information significantly more often than are nonmanagerial internal and external stars (Kruskal Wallis ANOVA; $p<.05$). Although formal status is helpful (all 7 of the supervisory boundary spanners are nominated as valuable sources of information), boundary spanning is more than a function of formal position in the hierarchy.

What are the relative contributions of being a boundary spanning individual, an internal or external star, or formal status in predicting nominations as a valuable source of new information and ideas? Consistent with the results shown above, a simultaneous multiple regression indicates that only being a boundary spanning individual and formal status are important determinants of being nominated. (The dependent variable was categorized as 0, 1, or 2 because of the distribution's extreme degree of skew.) Boundary spanning status is of greater importance than formal status in predicting the number of nominations as a valuable source of new information and ideas. The regression equation (with standardized betas) is:

TABLE 2
Individuals Nominated as "Valuable Sources of External Information and New Ideas" and Communication Roles for Nonmanagers

	Boundary Spanners	*Nonspanners*	*Total*
Valuable sources	12	60	72
Unnamed	3	105	108
Total	15	165	180

$X^2=9.167$ ($p<.003$)
Contingency Coefficient $=.23$

Number of nominations =

$$-.20^{*}\,(\text{status}) + .31^{**}\,(\text{BSI}) + .08\,(\text{internal star}) - .04\,(\text{external star})$$

$$F=8.77;\ df=4{,}198\ R^2=.39$$

$$^{*}p<.05$$
$$^{**}p<.01$$

What are the antecedents of those individuals who are internal and external stars? Hypothesis 3 suggests that there would be a positive association between being an internal star and being nominated as technically competent, and that perceived technical competence would be a more important determinant of internal star status than formal position in the hierarchy.

In support of Hypothesis 3, there is a significant positive association between being an internal communication star and being nominated as technically competent by one's peers. This association holds even after boundary spanning individuals are eliminated (Table 3). Individuals, then, approach those peers who are seen as competent, independent of their external linkage. Although internal stars are seen as technically competent, there is no association between being an external star and perceived competence.

To address Hypothesis 3A, a simultaneous discriminant analysis was employed to investigate the relative contributions of formal status and perceived technical competence in predicting internal stars. Both factors predict internal star status, but perceived competence is a more powerful predictor than formal status (the standardized discriminant coefficients are .74 and .52, respectively, the discriminant function being significant at less than the .001 level).

Hypothesis 4 suggests that external communication stars must have specialized characteristics and backgrounds to deal with the unique information requirements of different external areas. This broad hypothesis can be made more specific to the four external areas studied here.

TABLE 3
Individuals Nominated as Technically Competent and Communication Roles

A. *Internal Stars*—Including *Boundary Spanners*

	Stars	*Nonstars*	*Total*
Competent	23	52	75
Unnamed	14	115	129
Total	37	167	204

$X^2 = 11.241$ $p < .001$
Contingency Coefficient = .23

B. *Internal Stars*—Excluding *Boundary Spanners*

	Stars	*Nonstars*	*Total*
Competent	10	52	62
Unnamed	5	115	120
Total	15	167	182

$X^2 = 7.512$ $p < .01$
Contingency Coefficient = .20

C. *External Stars*—Excluding *Boundary Spanners*

	Stars	*Nonstars*	*Total*
Competent	23	39	62
Unnamed	44	76	120
Total	67	115	182

$X^2 = .01$ $p <$ N.S.
Contingency Coefficient = .01

Effective communication with other laboratory areas requires that the individual be familiar with the different work requirements and the locus of expertise in those areas. Literature on professional communication indicates that informal mechanisms are more vital than formal mechanisms for developing contacts and that having worked together is a major determinant of professional communication (Allen, 1977). Although working together may provide an informal linkage, formal status will also facilitate intra-laboratory communication. Communication to the corporation, on the other hand, is more constrained to formal mechanisms. Communication regarding schedules, costs, and budgets can best be accomplished via the formal hierarchy (Rosenbloom & Wolek, 1970).

Effective linkage to professional areas outside the organization can be accomplished only by those individuals with technical training and cosmopolitan orientation, that is, by those who are more professional (Kornhauser, 1963; Hage, 1974). Literature on professional communication also indicates that effective linkages are forged more through informal methods (e.g., worked together, contact at professional meetings) than through formal methods (Crane, 1972; Kronhauser, 1962). Communication with suppliers, vendors, or customers is more organizationally focused. A basic determinant of operational communication, then, is formal status or formal contact via prescribed channels (Tushman, 1979; Whitley & Frost, 1973).

Several analyses were conducted to test these specific hypotheses regarding the characteristics of external communication stars. Table 4 presents the results of several discriminant analyses of the characteristics of stars versus nonstars for each external area. Table 5 presents data on the methods used by communication stars to forge links with each area.

Contacts within the laboratory are established more through working together than through formal channels (Table 5). Neither status nor professional characteristics, however, serve to distinguish between stars and nonstars within the laboratory (Table 4). For corporate communication, on the other hand, contacts are forged more frequently through formal channels, and formal status is an important determinant of corporate communication. Organizational communication, then, is based on formal mechanisms, and laboratory communication is based more heavily on informal mechanisms.

Those individuals who are strongly linked to professional areas are more professionally oriented (in terms of papers presented, hours spent reading the literature) than are those individuals weakly linked to professional areas (Table 4). Professional communication bonds are forged through both formal and informal mechanisms (worked together, mutual acquaintances), and links to operational areas are developed primarily through formal channels. No demographic characteristics discriminate between operational stars and nonstars. As a set, then, these results indicate that communication stars in different areas develop their contacts differently, and they have specialized characteristics that are consistent with the information requirements of their particular communication boundary.

TABLE 4
Discriminant Analysis of Stars versus Nonstars for Four External Areas

Domain	*Variables*	*Discriminant Coefficients*	*Variable F Score*	*Overall F Score*	*Percent Classified*
Laboratory:	Status	.608	1.589	1.345	62.8
	Education	.925	1.504	(4,127 *DF*)	
	Hours read	.495	1.206		
	Papers	.517	1.066		
Corporate:	Status	.980	5.734*	3.604*	63.2
	Hours read	.457	1.454	(2,129 *DF*)	
Professional:	Papers	.543	15.511***	7.882***	87.8
	Education	.484	5.213**	(3,128 *DF*)	
	Hours read	.314	2.218		
Operational:	*F* level insufficient for computation				

*$p < .05$
**$p < .01$
***$p < .001$

TABLE 5
Methods of Establishing External Contacts

A. Contacts Within the Organization

Domains	*Formal Channels*	*Worked Together*	*Other*[a]	*Total*
Laboratory	150	341	64	555
Corporate	143	108	29	280
		$X^2 = 49.20$ $p < .001$		

B. Contacts Outside the Organization

Domains	*Formal Channels*	*Worked Together*	*Other*	*Total*
Professional	28	20	10	58
Operational	77	11	7	95
		$X^2 = 18.6$ $p < .001$		

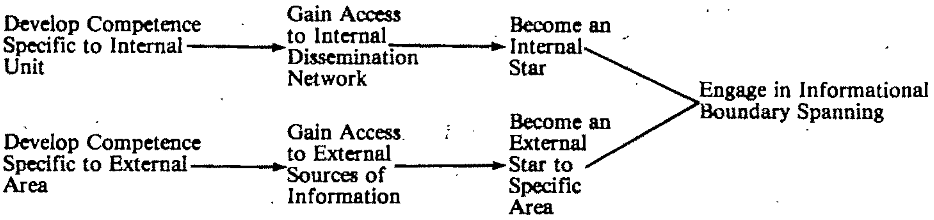
[a] See methods section of paper for detail.

DISCUSSION AND IMPLICATIONS

This research has investigated two interrelated questions: how do new ideas and information enter organizations, and what are the antecedents of those individuals who provide this informational link? The literature on boundary spanning suggests that external communication stars, internal stars, and those who are strongly linked internally and externally are each potential linking mechanisms for their more locally oriented colleagues. This research has hypothesized that due to differentiation and the concomitant specialization in languages and cognitive orientations, the transfer of information must occur in a multistep process. Informational boundary spanners must be able to translate across communication boundaries and be aware of contextual information on both sides of the boundary. It was hypothesized, therefore, that informational boundary spanning would be accomplished only by those individuals who were strongly linked internally *and* externally. The data strongly supported this hypothesis. Neither internal stars nor external stars were seen as valuable sources of new information and ideas. Extensive internal and external communication are each necessary but not sufficient conditions for informational boundary spanning. Boundary spanning individuals must gather and disseminate information and, as such, must be well linked internally *and* externally (Figure 1). Further, information boundary spanning was not limited to the hierarchy. A full 68 percent of the boundary spanning individuals were bench-level scientists or engineers.

These results strongly suggest distinguishing between informational and representational boundary spanning roles (Aldrich & Herker, 1977). This research supports other work that indicates that informational boundary spanning is a multistep process (Allen & Cohen, 1969; Wilensky, 1967).

FIGURE 1
Schematic of Informational Boundary Spanning Model


Develop Competence Specific to Internal Unit
Gain Access to Internal Dissemination Network
Become an Internal Star
Develop Competence Specific to External Area
Gain Access to External Sources of Information
Become an External Star to Specific Area
Engage in Informational Boundary Spanning

Informational boundary spanning frequently is an informal phenomenon and is associated with job satisfaction, morale, and promotion (Allen, 1970; Blau, 1963; Keller & Holland, 1975). Furthermore, because informational boundary spanners mediate a critical resource for the organization they will have substantial informal power and status (Pettigrew, 1972; March & Simon, 1958).

Representational roles, however, focus on resource acquisition and disposal—for example, salesmen, buyers, clerks (Adams, 1976). Because such roles are evaluated, rewarded, and trained for specific purposes, their sensitivity to exceptions, opportunities, or new ideas from outside the organization is reduced. Because of such formal roles, even if a salesperson (for instance) acquires an important technical idea, the organizational impediments to the successful transfer of this information are substantial (Von Hippel, 1976; Mansfield & Wagner, 1976). Thus, although these individuals in representational roles have substantial external communication (they transmit substantial information), they may not serve as an information linking mechanism for areas within the organization. Finally, although representational roles are formally defined, these individuals face multiple and often conflicting constituencies within and outside an organization (Miles & Perreault, 1976; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Unlike informational boundary spanners, representational roles usually do not mediate critical resources for the organization and, therefore, are not an informally powerful role.

Much of the ambiguity in the literature regarding boundary spanning and its consequences may be due to confounding informational and representational communication roles. Informational roles acquire information from external areas and transmit this information internally; representational roles perform a more routine transacting/representation role. Informational roles are involved in a two-step information flow; representational roles are involved more in a one-step flow. The antecedents and consequences of these roles are different due to their contrasting functions for their peers as well as for their organizations. Future research, therefore, must distinguish between boundary spanning individuals and those individuals with high boundary spanning activity.

What are the antecedents of boundary spanning roles? These results indicate that perceived work-related competence is a basic determinant of informational boundary spanning. Perceived competence is a more powerful determinant of internal consultation than is formal status. Technical competence and status are related, but this research and that of Blau (1963), Allen (1977), and Tushman and Scanlan (1981) suggest that competence is associated with colleague consultation and may, in turn, be associated with a promotion. Formal status then further facilitates an individual's ability to serve as a boundary spanning individual. Individuals consult those whom they see as competent, independent of formal status. These internal communication stars will therefore be able to disseminate effectively information and ideas.

To provide external linkage, internal communication stars must also be well connected to external areas. Communication with professional colleagues (either within the laboratory or outside the organization) requires the recoding and synthesis of equivocal information. Communication with organizational or operational areas involves sending and/or receiving less equivocal information. Consistent with differences in the nature of information requirements to different domains, external communication stars had specialized characteristics and used distinct methods to forge links with these different areas. Communication stars to other laboratory areas were established informally (usually by working together); communication stars to professional areas outside the organization tended to be professionally oriented and relied on formal and informal mechanisms to establish links with external colleagues. Communication to organizational and operational areas, on the other hand, was more formally constrained. Corporate communication stars tended to be supervisors whose organizational linkages were formed through formal channels. Operational communication links also were established through formal channels. These results, along with those reported by Keller, Szilagyi, and Holland (1976), Tushman and Scanlan (1981), and Whitley and Frost (1973), indicate that communication stars to different external areas have specialized characteristics and use distinct methods to develop effective linkages with their respective external areas.

External communication stars were not seen as more competent than nonstars, they were not seen as valuable sources of new information, and they were not strongly linked internally (only 25 percent were also internal communication stars). Internal communication stars, however, were seen as technically competent independent of their external linkage. This perceived local task expertise may be associated with informal power; internal communication stars who were not externally linked may well be influential for administrative or organizational decision making. Boundary spanning individuals with their internal and external expertise may be influential in both technical as well as administrative decision making. Those individuals who are simply external communication stars most likely will not be influential in either technical or administrative decision making. Future research must investigate the roles of internal stars and boundary spanning individuals in organizational decision making (Pettigrew, 1972; Spekman, 1979; Aldrich & Herker, 1977).

How, then, does the project leader or technical staff member (discussed earlier) acquire relevant, timely, and useful external information? This research indicates that individuals approach informal boundary spanning individuals who steer them to the relevant information or provide that information directly. This is an informal process in which individuals only approach those whom they see as technically competent and who have well developed linkages to specific external areas. Different individuals evolve to handle distinct external information areas (Tushman & Scanlan, 1981).

Can this emergent phenomenon be managed? This research indicates that management can facilitate the evolution and development of boundary spanning individuals (Farris, 1972; Allen, 1977). A subset of an organization's technically competent staff can be selected (Keller & Holland, 1978) and given the opportunity to develop contacts and broaden their exposure with other areas of the corporation through transfers, work assignments, and in-house training. Management could encourage more extensive external communication through work assignments, travel allowances, or through special education programs. Managers, then, can select potential boundary spanning individuals and systematically facilitate the development of their internal and external communication networks. Finally, although formalizing informational boundary roles might be dysfunctional (Miles & Perreault, 1976; Keller et al., 1976), their promotion may be functional. Promotion of boundary spanning individuals not only recognizes and rewards that activity, but also permits those individuals to develop more diverse internal and external communication networks (Tushman & Scanlan, 1981).

Beyond these formal mechanisms, management also must create the climate in which it is legitimate to ask for assistance, in which providing this expertise is recognized, valued, and rewarded. Norms must evolve so that those with the relevant task expertise, whether they be supervisors or peers, are encouraged to provide work-related assistance to their colleagues. This emergent boundary spanning process can then be facilitated through formal and informal mechanisms.

In summary, this research has investigated one mechanism by which information is imported into organizations. Building on existing research, these results indicate that informational boundary spanning occurs in a two-step process by individuals who are able to gather information from external areas and disseminate that information to their colleagues. These key individuals are seen as among the most competent individuals in their unit, and they have specialized characteristics to facilitate communication with distinct external areas. Future research must clearly distinguish between informational (a two-step process) versus representational (a single step process) boundary spanning roles, investigate other mechanisms for information transfer, and explore the role of boundary spanning individuals in organizational decision making.

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Deterrents to Divestiture[1]

KATHRYN RUDIE HARRIGAN
Columbia University

The deterrent effect of exit barriers, industry structural traits and competitive posture investments, on the firm's ability to divest a failing business with ease is explored, using analyses of these traits and investments. The influence of these barriers on timely exit decisions was found to vary according to different types of industries.

The timely extrication of a firm's resources from a business that is failing can be a delicate maneuver. Studies by Caves and Porter (1976), Harrigan and Porter (1978), and Harrigan (1979) have indicated that where a thin resale market exists for the assets of a business, or for the business unit itself, successful divestiture may be particularly difficult to attain. This immobility is due, in part, to substantial investments the firm may have made in automated manufacturing processes or other forms of entry barriers (which may have effectively protected a niche of the firm's businesses from potential entrants in an earlier period of the business's evolution) which later constitute "exit barriers." The forces of these exit barriers may be among the major difficulties firms encounter in spinning-off or discontinuing such businesses because they are economic factors that can exacerbate the difficulty of retrieving the value of the assets in question. Porter (1976) suggested that these barriers could be economic or strategic in nature and could be identified by reviewing the industry's structural traits or by reviewing the firm's strategic posture within the affected market. "Entry barriers," a central concept in the study of industrial organization economics, are structural traits within an industry that discourage entry by new competitors and permit prices to exceed costs by more than "normal profits" if entry barriers are high (Bain, 1956, 1972; Modigliani, 1958; Gaskin, 1971; Caves & Porter, 1977). Exit barriers can discourage exit by existing competitors even where prices are lower than costs if the exit barriers are high.

The potentially deterrent effect of these structural traits on a particular firm's business unit would be expected to vary according to the types of

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competitive investments the firm made. Differences in firms' asset vintages and densities, as well as in their distribution network relationships, could allow some firms to exit with greater ease than others whose postures include more of the structural traits that had evolved into exit barriers. This study reports on attempts to isolate the effects of these exit barriers.

EXIT BARRIERS

Economic

Other factors held constant, it would be expected that the presence of high economic exit barriers would deter firms' timely exits and result in high opportunity costs being incurred. Economic exit barriers represent factors that will influence a firm to operate its assets even if it earns a subnormal rate of return on them. They can be the costs associated with eliminating a plant (such as the cost of dismantling a chemicals plant and treating the land beneath the plant) or the deterrent effect created by the lack of a resale market for the plant and assets. Their effect is to keep excess capacity that should have been retired. The economic analysis used to determine whether to discontinue investments that are not earning acceptable returns could advise retaining these businesses in which the assets are relatively new and undepreciated until their value has been recovered in operations (through depreciation). Assets that are capitalized can act as deterrents to exit by virtue of the reporting loss they could create if the firm exited before depreciating them.

The economic valuation regarding whether a particular investment should be retained (the abandonment value calculation) compares the (discounted) expected value of continued, future operations (as the numerator) with the expected salvage or sale value available upon exit (as the denominator). If the disposal value of an asset will be low (due to the technological factors explained below), the calculation of whether to remain invested will yield a ratio that is greater than 1 (which would advise continued operations).

Porter (1976) suggested that the factors that influence the "height" of economic exit barriers are predominantly characteristics that relate to the product's manufacturing technology: (1) capital intensity, (2) asset specificity, (3) age of the assets (the extent to which their value has been depreciated), and (4) technological or operating reinvestment requirements. If the expenditures for other types of investments—advertising, R&D, or plant improvements—are not expensed, they too could constitute economic exit barriers in the sense that they might appear as an undesirable reported loss upon disposal when the firm exited.

Economic exit barriers are important because they may deter the firm's timely exit from an industry in which it may be suffering losses. If the value of a firm's fixed and working capital investments will be difficult to retrieve, it would be expected that high economic exit barriers could lock a firm into prolonged competition at unattractive returns. Other things held constant, it would be expected that if exit barriers are high, competition may be more volatile among the "trapped" participants because their cost structures may encourage them to use price-cutting in order to fill their plants.

Physical assets such as plant, machinery, and inventory comprise the major types of economic assets that could act as exit barriers, although a plant that is shared with another business could also constitute such a barrier. The effect of these assets can be particularly devastating upon the firm's cash flow when small cash expenditures are required each year to keep these assets operating. The firm facing them may elect to bleed to death slowly by remaining invested in a low return business rather than incur the large cash outflows that may be necessary to hurdle these exit barriers.

The relative height of economic exit barriers may be measured by the costs associated with eliminating a plant or undepreciated assets, or as the opportunity costs incurred by operating a plant and holding inventories beyond the time when performance levels and demand for the firm's products justify this behavior. In this study, high manufacturing, or technology, related exit barriers (those for which the cost of disposal would be more than 10 percent of the firm's reported net income) were expected to be a strong deterrent, particularly where this trait occurred in the presence of other types of factors that also discouraged exit. These other types of investments—advertising, R&D, plant improvements, or goodwill-generating expenditures—could also constitute economic exit barriers (due to reporting losses) if they were not expensed upon occurrence. But they are more likely to constitute "strategic exit barriers," that is, factors defining a firm's strategic posture, which it may be unwilling to sacrifice by exiting prematurely.

Strategic

Deterrents to exit could also emanate from the firm's reluctance to sacrifice the benefits of cumulative, intangible assets which it has created through previous investments. "Strategic" exit barriers could be created by image maintenance goals, customer service obligations, the potential loss of customers or distribution channels, internal synergies between related businesses, shared facilities, or a highly successful market position. These benefits constitute exit barriers when a thin resale market for the business itself makes recovery of these asset values difficult and hence exit impossible due to quasicontractual and other strategic obligations that had once been undertaken and cannot be easily discharged in an adverse market. Caves and Porter (1977) established that the force of intangibles as exit barriers, which had not been recognized previously, could indeed be substantial. They isolated the relative deterrent effect of a number of factors: a high quality image (created by previous R&D, production, or advertising expenditures) which could be damaged for other products in terminating the business; physical facilities shared with other healthy businesses that the firm preferred to retain; goodwill and loyalty in distribution channels and strong corporate recognition (created by previous marketing expenditures) which could be damaged for other businesses by abandoning the business in question; customer industries possessing strong bargaining positions that, as Porter (1975) has suggested, have relied on the products to be discontinued and that could potentially damage the firm's competitive position in other markets; and a business being of high strategic importance to the firm. (A business is of high strategic importance to the firm in this study if it is the only or major business the firm is in, or if the firm faces the possibility of significant negative repercussions to its other businesses by virtue of its strong and widely recognized former association with the divestiture candidate business.)

Expectations

Even if demand for the products of competitors may be declining, favorable expectations concerning demand for products of an individual could induce that firm to remain invested in the face of adversity. If a firm served a lucrative subset of customers (for example, premium handmade cigars within the otherwise troubled cigar business or rayon filament suit lining fibers within the otherwise beleaguered cellulosic fibers business), it would expect its customers not to switch to other products and hence would not divest assets used to serve the market niche in which demand was expected to remain lucrative. Because firms' expectations were expected to influence the number of firms remaining in an industry, structure was examined in light of competitors' individual expectations that healthy demand would endure for them for a longer time into the future than for competitors.

THE SAMPLE

This study's central hypothesis was that the deterrent effects of exit barriers within various industry environments differ due to their structural variations. The structural and strategic factors that might deter divestiture of a business unit would be most vividly apparent where there are significant reasons for the firm to exit, for example, where demand for the products of an industry has been declining for a protracted time period with little apparent hope for revitalization.

The deterrents to divestiture sketched above were examined by studying the exit decisions of 61 firms that competed in 8 declining businesses during the years 1965-1978. (The businesses studied were: percolator coffee makers, receiving tubes, rayon and acetate, acetylene, cigars, synthetic soda ash, American leather tanning, and baby foods. A subset of the firms studied in these industries did exit during the period under observation.)

FIGURE 1
Taxonomy of Research Design for Multiple Industry Sites Incorporating Salient Industry Structural Traits

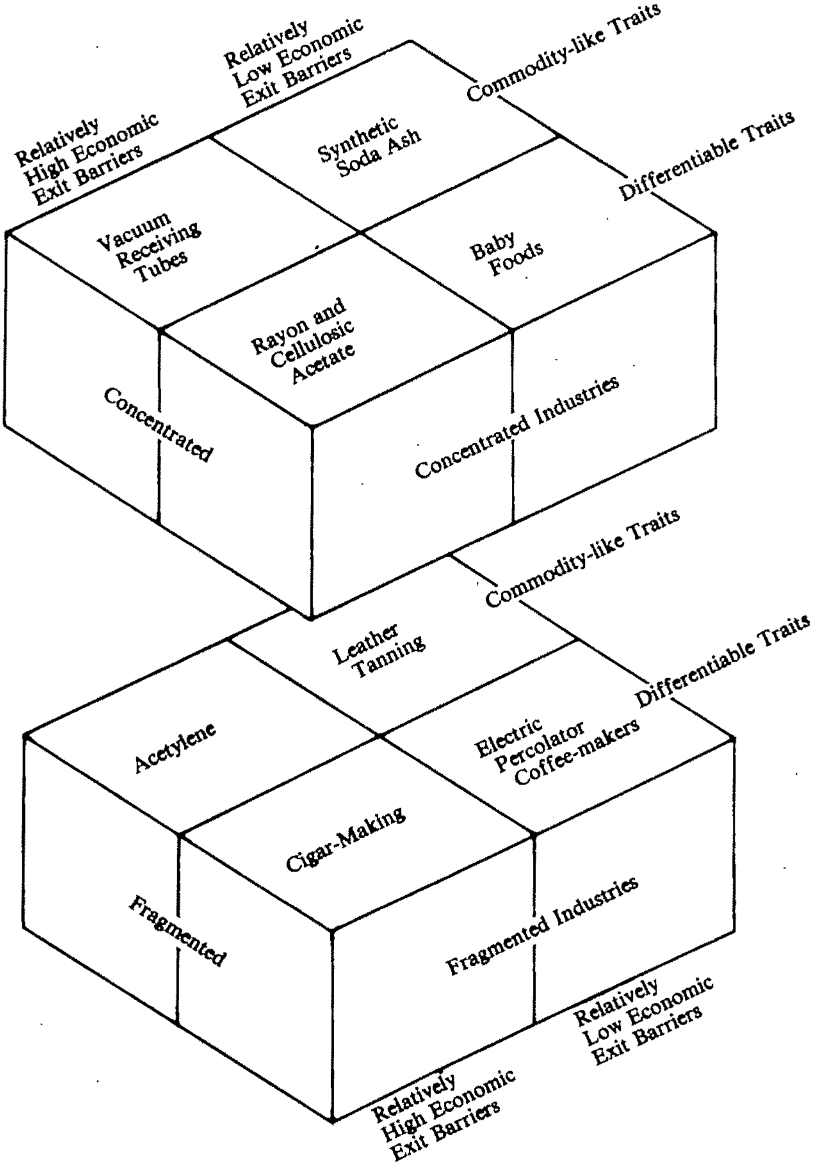

Figure 1 illustrates the research taxonomy employed to design a balanced sample that would offer the potential of equal numbers of firms possessing the various traits believed to be significant in offering relatively hospitable or inhospitable environments for competition. The firms and businesses studied were purposely selected to compare high degrees of product differentiation with low differentiation, volatile competitive structures with relatively more stable ones, and high capital intensity (exit barriers) with low ones. (Capital requirements for entry in 1965 were used to approximate exit barrier height.) Data regarding each observation were collected from published documents and supplemented by interviews with the affected business units. Interview subjects provided information regarding customers, height of exit barriers, technologies, and other competitive factors. Evidence of losses was documented by newspaper announcements and corporate annual reports. In many cases, the executives who decided to divest a particular business were available to discuss their decisions and those of competitors.

A universe of declining businesses was generated by studying series of unit sales volume data as reported in the *1972 Census of Manufacturers* (and updated reports), issues of the *Survey of Current Business*, and industry data series from various trade publications. The industry sample was designed to obtain four observations within each of eight structure cells in order to permit the researcher to control for the presence of these structural variables that were (a) observable and (b) believed to be among the most significant factors appropriate for study. Interviews with a total of 36 of the 61 target firms, several suppliers and customer firms, plus industry association representatives provided the data that comprised the sample.

Financial data that would have permitted a more robust test of the hypotheses regarding structural factors and exit barriers explained above are not generally available, until line-of-business reporting data are at last collected and made available to researchers. This data deficiency is troublesome in the study of diversified firms because annual report information and census data necessarily aggregate much of the cost and performance data that might offer insights regarding business unit strategies.

In this study, for example, the relevant unit for analysis was the strategic business unit (SBU) that used plants and other competitive resources dedicated to that particular business unit within a larger, diversified firm. Individual profit center data were not available. Only slightly more than half of the 36 competitors interviewed were willing to supply disguised financial figures of the type that would have been necessary to draw stronger conclusions than those presented from this study. A number of observations were not adequate for significant statistical analysis. Therefore, a relative scaling—low (.00) to high (.99)—for each of the factors investigated was produced by questioning the industry participants and observers described above regarding their perceptions of the relative height of these barriers for each industry competitor. Interviews, telephone conversations, follow-up letters, and revisions of preliminary drafts describing these barriers by the participants themselves provided revised estimates in a Delphi-like procedure until ratings for the 61 competitors' structural contexts were developed. The variables employed were moderately collinear in some cases but can suggest some conclusions regarding the effect of relative heights of structural factors faced by firms in this sample.

THE MODEL

Specifications

The relationship of the industry traits and strategic posture factors sketched above to the likelihood that a firm would divest this business could be specified in a model using a binary dependent variable, the decision whether to exit (where exit = 1). In an ordinary least squares specification of this model, the coefficients of the independent variables (b_i) may be interpreted to represent the relative percentage contributions to the likelihood that exit would occur. The model could be stated in the following form:

$$y = a + b_i x_i + e$$

where y = likelihood of exit and the structural and corporate inducements and deterrents to exit (x_i) are as follows: (a) a high quality product image; (b) the presence of a strong customer industry (whose patronage for other products might be lost by discontinuing the products of the business in question); (c) facilities shared between businesses where one of the businesses is a candidate for divestiture; (d) good distribution channel relationships and strong brand or corporate identification (created through previous expenditures for promotional activities and advertising); (e) economic exit barriers related to the manufacturing technology and its physical assets; (f) a favorable expectation that demand for the products of the business unit considered for divestiture will endure for a favorable period into the future; and (g) the incurrence of substantial losses from operations. Divestiture is also expected to be deterred if the business is of high strategic importance to the firm. The discussion which follows describes the harmonic mean of the alternative coefficients generated for each respective factor tested.

Predictions

Table 1 (presenting results for 61 firms' behaviors) indicates that divestiture will be deterred by the relative influences of a number of factors. (The numbers in parentheses discussed in the text represent harmonic means of the estimated parameter value under discussion. These numbers, which may be interpreted as relative percentage contributions to the firm's propensity to exit, were calculated from the values shown for the several alternative specifications offered. For example, in Table 1 the harmonic mean

TABLE 1
Regression Analysis on Exit[a]

Alternative Specifications of the Model of Exit Behavior	*Coefficient of Multiple Determination (R^2)*	*High Quality*	*Strong Customer Industry*	*Shared Facilities*	*Promotion/ Advertising Barriers*	*Manufacturing/ Technology Barriers*	*Favorable Industry Environment*	*Losses*	*High Strategic Importance*	*Constant*
1.	.555	-.2623 (.0107)	-.2374 (.0245)	-.3256 (.0015)		-.3833 (.0007)	-.3209 (.0017)	.3231 (.0022)		1.1629 (.0001)
2.	.503	-.2841 (.0088)	-.1412 (.2019)	-.2501 (.0222)	-.1930 (.0620)	-.3736 (.0016)	-.4008 (.0002)			1.2744 (.0001)
3.	.475	-.2905 (.0116)	-.2324 (.0451)	-.3109 (.0048)		-.2955 (.0139)		.3964 (.0005)	-.1101 (.3189)	.9883 (.0001)
4.	.448	-.2541 (.0241)	-.3221 (.0050)	-.2262 (.0325)			-.2584 (.0175)	.3146 (.0063)		.8648 (.0001)
5.	.401	-.2754 (.0188)	-.2246 (.0574)	-.1530 (.1741)	-.1957 (.0812)		-.3380 (.0024)			.9815 (.0001)
6.	.367	-.2775 (.0200)	-.2685 (.0234)	-.2056 (.0647)			-.3352 (.0030)			.9624 (.0001)
7.	.3421			-.3001 (.0113)		-.4350 (.0007)	-.4743 (.0001)			1.1063 (.0001)
8.	.3127		-.2645 (.0259)		-.2428 (.0339)		-.3989 (.0005)			.8594 (.0001)
9.	.2935	-.4256 (.0004)		-.2685 (.0274)		-.3359 (.0090)				.9618 (.0001)
10.	.2679			-.3056 (.0144)		-.3809 (.0040)		.4045 (.0013)		.7299 (.0001)
11.	.2542	-.4090 (.0010)		-.1153 (.3384)	-.2337 (.0524)					.7250 (.0001)
12.	.2525	-.3875 (.0024)	-.1668 (.1957)			-.2058 (.1086)				.8007 (.0001)

[a] Parenthetical figures represent levels of significance, the probability indicated in using the student's t value for testing the null hypothesis that the parameter equals zero.

value for "losses" was calculated from the four estimated parameter values presented. Several alternative specifications of the model are presented by adding and deleting individual factors in order to demonstrate the joint effects of the factors as well as the relative magnitude of their influences on an exit decision. The firms contained in each subsample are varied according to the research taxonomy presented in Figure 1.) These factors are: (a) an image of high product quality (-31 percent); (b) the presence of a strong group of customers (-25 percent); (c) facilities shared with other apparently healthy businesses (27 percent); (d) good distribution channel relationships and strong product identification created through previous expenditures for promotions and advertising (-21 percent); (e) economic barriers related to the manufacturing technology and its physical assets (-38 percent); and (f) a strong expectation that demand for this business unit's products will endure for a favorable period in the future (-35 percent). The presence of one or more of these factors will deter timely exits. The incurrence of losses will increase the relative likelihood that a firm would divest a declining business unit (35 percent). The tables interpreted below also indicate that where losses were a significant factor, the relative weight of this variable frequently equalled or exceeded the relative deterrent effect of other individual structural factors.

Table 2 summarizes correlations that existed between the factors tested in the sample of 61 firms operating declining businesses. This table suggests that strategic exit barriers are generated by the firm's investment decisions and operating policies. Relatively high product quality, the establishment of promotional and advertising capital, and a history of providing customers with desirable products create conditions that could act as exit barriers by making firms unwilling to abandon these intangible assets. The variables presented here are highly statistically significant and their signs are as expected.

The interactions of these structural factors were explored by subsetting the sample according to the attributes that defined the research taxonomy. The relative influence of differing degrees of strategic importance (the business was a major contributor to total sales of, or closely identified with, the firm) was also explored. Again, the incurrence of losses encourages exit, but some structural traits do constitute formidable exit barriers.

The sample of declining business was bifurcated into those firms facing relatively high economic exit barriers related to manufacturing technologies and those firms whose economic exit barriers were low. In Table 3, and others that follow, identical specifications of the model for each subset are presented to show the changes in the relative magnitude of these factors' effects on exit decisions. Variables are added to or subtracted from the specification in an attempt to suggest, not merely the best-fitting model, but also how the presence or absence of some of these variables affected the others.

Table 3, which summarizes the relative influences of variables that were significant to the exit decision, indicates that in the case of the subset of

TABLE 2
Correlation Coefficients of Predictive Variables

	High Product Quality	*Strong Customer Industry*	*Shared Facilities*	*Promotion/ Advertising Barriers*	*Manufacturing/ Technology Barriers*	*Favorable Industry Environment*	*Losses*	*High Strategic Importance*
High product quality	1.000							
Strong customer industry	.257	1.000						
Shared facilities	.021	–.137	1.000					
Promotion/advertising barriers	.068	.183	.237	1.000				
Manufacturing/technology barriers	–.011	.258	–.304	–.015	1.000			
Favorable industry environment	.224	.021	.012	–.004	–.185	1.000		
Losses	–.088	.138	.039	–.156	.093	–.271	1.000	
High strategic importance	.354	.299	–.046	.380	.237	.048	–.058	1.000

TABLE 3
Exit Behavior in Businesses Where Economic Exit Barriers Are High Compared with Businesses Where Economic Exit Barriers Are Relatively Low[a]

Alternative Specifications of the Model of Exit Behavior		*High Quality Image*	*Strong Customer*	*Shared Facilities*	*Promotion/ Advertising Barriers*	*Favorable Environment*	*Loss*	*Highly Strategic*	*Constant*	*Coefficient of Multiple Determination (R^2)*
1.	High				-.3838 (.0034)	-.4559 (.007)			.6624 (.0001)	.3625
	Low				-.0963 (.6590)	-.5037 (.0318)			.9111 (.0001)	.2707
2.	High			-.3408 (.0110)		-.5194 (.0003)			.7097 (.0001)	.3263
	Low			-.2000 (.5576)		-.4364 (.0959)			1.000 (.0016)	.2777
3.	High			-.3489 (.0410)	-.4354 (.0100)				.8435 (.0001)	.3214
	Low			-.0386 (.8679)	-.0401 (.8643)				.2923 (.0918)	.0049
4.	High	-.4840 (.0009)	-.1724 (.2477)						.6335 (.0001)	.3024
	Low	-.1628 (.5442)	-.1977 (.4474)						.7326 (.0006)	.0887
5.	High						.2890 (.0405)	-.3728 (.0075)	.4432 (.0003)	.2526
	Low						.5658 (.0338)	-.0356 (.8794)	.4413 (.0090)	.2608
6.	High		-.2272 (.1386)			-.4102 (.0045)			.6573 (.0001)	.2473
	Low		-.2788 (.1842)			-.5240 (.0202)			1.0144 (.0001)	.3409
7.	High					-.3750 (.0152)	.1667 (.2723)		.4167 (.0007)	.2278
	Low					-.5247 (.0072)	.5864 (.0074)		.7284 (.0001)	.5349

[a] Figures in parentheses indicate levels of significance, the probability indicated in using the student's *t* value for testing the null hypothesis that the parameter equals zero. Mean likelihood of exit in businesses – economic exit barriers – high = 33.33%. Mean likelihood of exit in businesses – economic exit barriers – low = 57.89%.

firms facing high economic exit barriers: (a) strategic exit barriers could interact with economic exit barriers to discourage divestiture (with a harmonic mean for this table of -37 percent); (b) shared physical facilities exerted a deterrent effect similar to the presence of high manufacturing technology-related barriers (-48 percent); (c) the establishment of distribution channel relationships and a distinctive product image (through advertising) exerts a stronger deterrent effect where economic exit barriers are high (-40 percent); and (d) only the expectation of enduring demand is a significant deterrent regardless of the height of economic exit barriers (43 percent and 49 percent, respectively). As expected, the incurrence of losses exerts a stronger encouragement to divest a declining business unit if economic exit barriers are relatively low (57 percent as compared with 28 percent). The other factors tested were not significant deterrents if the physical exit barriers were not substantial deterrents.

Table 4 compares the effects of the structural factors on exit. The sample has been partitioned into firms whose declining products could be significantly differentiated and firms whose products were commodity-like in nature and may be only slightly differentiated (perhaps by service offerings). This grouping indicates that if the products could be significantly differentiated: (a) economic exit barriers due to manufacturing technologies (a harmonic mean of -37 percent) could be overcome by the incurrence of losses (44 percent), but neither factor was significant if the products were commodity-like; (b) facilities shared with nondeclining businesses exerted a particularly strong deterrent effect on businesses whose products were commodity-like (-42 percent) but were not significant in the sample possessing differentiable products; and (c) the image of relative product quality acted as a significant deterrent in both groups, although it was particularly strong in the commodity-like group for which there were few bases to distinguish one firm's product from another's (-75 percent), where personal service, speedier delivery, or some other extrinsic attribute would be valued as an attainment allowing one vendor of undifferentiated products to gain an advantage over others.

Table 5 summarizes the results of specifications tested for a sample of firms whose declining business units had been of high strategic importance and for those whose business units were of relatively low strategic importance. This positioning indicated that for companies whose businesses were of high strategic importance (a) an image of high product quality was a relatively strong deterrent (-36 percent) to exit and (b) the presence of a strong customer group exerted significant pressures on the firm not to divest (-54 percent). Losses were a relatively low inducement to exit; moreover, they were not statistically significant in these specifications, indicating that if the firm already perceived a business to be strategically important, the presence of exit barriers further deterred exit even if the firm suffered losses.

For companies whose businesses were of relatively low strategic importance, the difficulty of disentangling shared facilities (-42 percent), the

TABLE 4
Exit Behavior in Businesses Where Products Are Differentiable Compared with Exit Behavior in Businesses Where Products Have Commodity-Like Traits[a]

Alternative Specifications of the Model of Exit Behavior		*High Quality Image*	*Strong Customers*	*Shared Plant Facilities*	*Promotion/ Advertising Barrier*	*Manufacturing/ Technology Barrier*	*Loss*	*Constant*	*Coefficient of Multiple Determination (R^2)*
1.	Differentiable			-.1747 (.2573)		-.3826 (.0273)	.4458 (.0031)	.5409 (.0105)	.3030
	Commodity-Like			-.4856 (.0212)		-.1975 (.3302)	.2716 (.1939)	.9300 (.0002)	.2984
2.	Differentiable	-.3395 .0192		-.1914 (.2401)		-.4153 (.0239)		.8951 (.0005)	.2318
	Commodity-Like	-.5128 (.1481)		-.4017 (.0554)		-.1538 (.4309)		.9915 (.0001)	.3135
3.	Differentiable	-.3222 (.0278)	-.0727 (.7807)			-.3159 (.0545)		.7587 (.0125)	.2013
	Commodity-Like	-.7500 (.0467)	-.3500 (.2025)			-.0001 (.9999)		.7500 (.0002)	.2333
4.	Differentiable	-.2986 (.0477)	-.0931 (.7311)					.5324 (.0613)	.1081
	Commodity-Like	-.7500 (.0412)	-.3500 (.1516)					.7500 (.0001)	.2333
5.	Differentiable			.0296 (.8548)	-.1203 (.4449)			.3373 (.0231)	.0168
	Commodity-Like			-.3889 (.0776)	-.2500 (.3640)			.8889 (.0001)	.2445

[a] Figures in parentheses indicate levels of significance, the probability indicated in using the student's *t* value for testing the null hypothesis that the parameter equals zero. Mean probability of exit where products are differentiable = 28.94%. Mean probability of exit where products are commodity-like = 60.87%.

TABLE 5
Exit Behavior in Businesses of High Strategic Importance to Firms Compared with Businesses of Low Strategic Importance[a]

Alternative Specifications of the Model of Exit Behavior		High Product Quality	Strong Customer Industry	Shared Physical Facilities	Promotion/ Advertising Barrier	Manufacturing/ Technology Barrier	Favorable Industry Environment	Losses	Constant	Coefficient of Multiple Determination (R^2)
1.	Important	-.3882 (.0044)	-.6157 (.0010)	-.1804 (.2047)					1.0412 (.0001)	.4691
	Not Important	-.1078 (.6491)	.0309 (.8595)	-.4797 (.0150)					.8950 (.0001)	.2496
2.	Important	-.3256 (.0149)	-.5000 (.0034)			-.1686 (.2954)			.9419 (.0001)	.4583
	Not Important	-.4913 (.0903)	.1391 (.5067)			-.2530 (.2567)			.7581 (.0002)	.1064
3.	Important		-.5175 (.9949)		.2275 (.1085)		.1100 (.4354)		.6875 (.0005)	.3632
	Not Important		-.0507 (.7374)		.4819 (.0127)		-.4069 (.0132)		.8863 (.0001)	.3889
4.	Important			-.1515 (.3873)		-.4242 (.0431)	-.3636 (.0265)		.8333 (.0044)	.2575
	Not Important			-.4196 (.0160)		-.2925 (.0735)	-.4236 (.0155)		1.1988 (.0001)	.4175
5.	Important	-.3581 (.0271)		.0074 (.9642)	.0790 (.6246)				.3725 (.0375)	.1953
	Not Important	-.1869 (.3648)		-.3524 (.0503)	.4812 (.0143)				.9528 (.0001)	.4008
6.	Important			-.3758 (.0149)	.3597 (.0417)			.3758 (.0149)	.7709 (.0001)	.0457
	Not Important			.0489 (.7882)	.1038 (.5595)			.1370 (.4630)	.1006 (.5160)	.5058
7.	Important			-.4848 (.0034)		-.2001 (.1794)		.4514 (.0050)	.8494 (.0001)	.1455
	Not Important			-.0707 (.7001)		-.4040 (.0756)		.2121 (.2469)	.5353 (.0376)	.4601

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[a] Figures in parentheses indicate levels of significance, the probability indicated in using the student's *t* value for testing the null hypothesis that the parameter equals zero. Average likelihood of exit where business is LOW = 58.06% – mean of dependent variable; average likelihood of exit where business is HIGH = 23.33% – mean of dependent variable.

TABLE 6
Harmonic Mean—Rankings of Relative Influences upon the Likelihood of Exit

	Reputation of High Product Quality	*Strong Bargaining Position of Customer Industry*	*Physical Facilities Shared With Nondeclining Business*	*Barriers Created by Previous Promotion or Advertising Expenditures*	*Manufacturing or Technology Related Barriers*	*High Expectations of Favorable Industry Environment*	*Losses (Positive Sign)*	*Business of High Strategic Importance*
Aggregate sample of 61 firms	4	6	5	7	1	3	2	(a)
Sample facing high economic barriers	1	(a)	5	3	—	2	6	4
Sample facing low economic barriers	(a)	(a)	(a)	(a)	—	2	1	(a)
Sample's product could be significantly differentiated	3	(a)	(a)	(a)	2	—	1	—
Sample's product was commodity-like in nature	1	(a)	2	(a)	(a)	—	(a)	—
Sample's business is of high strategic importance	4	1	(a)	(a)	2	3	(a)	—
Sample's business is of low strategic importance	1	(a)	3	2	6	4	5	—

(a) = not significant in this specification.

loss of a high quality reputation (–49 percent), and the potential loss of benefits from promotional and advertising investments (–43 percent) acted as relatively strong deterrents to exit, each exerting a relatively stronger deterrence than did the force of suffering losses from operations (41 percent).

Table 6 summarizes the relative importance of the structural factors tested upon the likelihood that a firm would divest its declining business unit. (Harmonic means calculated from the coefficients of statistically significant independent variables are the basis of this ranking.) Losses were either not statistically significant or were of a lesser magnitude than another factor in five of the seven samples tested.

Table 7 summarizes the differences in mean values of exit for each of the sample subsets examined. From Table 7 it will be seen that firms in the subsample facing relatively low economic exit barriers or producing commodity-like products were most likely to exit. Businesses held by firms to be of relatively low strategic importance were also relatively more likely to be divested. These findings substantiate the likelihood that exit barriers do indeed exist—barriers that could deter a firm suffering losses within a declining industry from making a timely exit.

TABLE 7

Comparisons of the Mean Values of Exit for Various Partitioned Samples

	Average Likelihood of Exit (Percent)
Total sample	41.0
Relatively high economic exit barriers	33.3
Relatively low economic exit barriers	57.9
Differentiable product traits	28.9
Commodity-like product traits	60.9
High strategic importance	23.3
Low strategic importance	58.1

LIMITATIONS OF THE FINDINGS

Given the nature of the data gathered in this study of exit barriers and firms' strategies (multiple-site interview data supplemented by library research), the study and its findings are subject to limitations regarding what can be known about a particular firm's divestment decision. The 61 observations of firms' behaviors, which were reconstructed from interviews and published information, could misrepresent behavior if another factor not measured herein were actually operative.

In a study in which there are many structural variables that interacted with each other and there are substantial differences between firms' strategic postures and initial conditions (conditions before many competitors considered exit as a response to declining demand), one must be conservative regarding the degree of confidence with which the interpretations presented can be asserted. The data seem to indicate that certain factors are significant in predicting exit more frequently than others. These variables are the factors presented herein. The presence (or absence) of some of the structural factors detailed above does seem to correlate with the expected presence of exit behaviors and the firms' actions in overcoming them.

The factors tested in the predictive model represent the most significant specifications regarding the likelihood of exit. Many other factors were tested; some of them were found to be highly correlated with the presence or absence of exit. These included: R&D related barriers (-.41); a strong perceived difference between competitors' products (-.37); customer and distribution channel goodwill barriers (-.32); high advertising expenditures (-.32); high recognition of a competitors' corporate logo (-.30); image of technological leadership (-.30); and relatively low operating costs (-.30). Some of these individual factors are proxies for each other and for variables in the specifications tested. They are not included in the specifications due to collinearity with other predictors. Also, other types of specifications were tested (such as weighted least-squares and the nonlinear cumulative logistic function), which did produce higher coefficients of multiple determination, but the corresponding beta values of the independent variables were also more difficult to interpret operationally. The other specifications, in general, agreed in sign and statistical significance with those of the predictors in this study.

CONCLUSIONS

The findings of this study, which concentrated exclusively on behavior in declining industries, differs from the findings of Caves and Porter (1976) regarding manufacturing or technology in related exit barriers. They did not find a statistically significant pattern with respect to these factors. The exit models of the present study indicate that the presence of high economic exit barriers consisting of durable and specific assets could be a highly significant influence on behavioral outcomes by decreasing the likelihood of an early exit. Thus, one could infer that high manufacturing exit barriers could lead to lower than average profits when demand for a business's products declines. This study's findings regarding the influence of intangible exit barriers concur with the findings of significance in the Caves and Porter study. As with tangible asset investments, promotional or distribution goodwill and other intangible assets do constitute significant exit barriers by acting as a structural trait that could also influence the performance of competitors in a declining market by delaying their exits.

The implications of these findings suggest that firms will want to plan their exits at the time of entry into a business. Given short life cycles for new products, it is not unreasonable to make provisions for the efficient removal of excessive capital from low or negative growth businesses when contemplating investment. This field of study can help the practicing strategist to assess the dynamics of the firm's competitive position with greater insights concerning the future barriers present investments can create. Specific operating guidelines for strategists facing declining industries are offered elsewhere (Harrigan, 1980).

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Intraorganizational Conflict in the Hospital Purchasing Decision Making Process

DANIEL S. COCHRAN
Mississippi State University
DONALD D. WHITE
University of Arkansas

Empirical data collected from administrators and purchasing managers in 56 general short term hospital facilities together with in-depth interviews conducted in 9 hospitals provided insights as to the frequency, location, and nature of purchasing related conflict.

Interest in the management of conflict has grown rapidly over the last few years. Thomas and Schmidt (1976) in a recent AMA survey found that upper and middle level managers expressed a keen and growing interest in learning more about both the prevention and the management of intraorganizational conflict. Unfortunately, literature on the subject too often has addressed itself to the theoretical nature of conflict or has provided unsupported prescriptions for diminishing its "counterproductive" impact on the organization. Far too few empirically-based studies have focused on conflict in specific organizational situations, and even fewer have effectively examined conflict in health care institutions.

In a recent review of industrial buying behavior literature, Bonoma, Zaltman, and Johnson (1977) reported that a major gap in the purchasing decision making process literature presently exists. In particular, they noted that research concerning the interactions of buying center members (or decision making unit members) was lacking. Such interaction potentially may lead to conflict and its resolution (Zaltman & Bonoma, 1977). Therefore, this void in the literature logically may also inhibit our understanding of conflict and its resolution in purchasing-decision situations.

Rakich, Longest, and O'Donovan (1977) have identified managing organizational conflict as one of three major problems faced by hospital organizations. Furthermore, they state that "the tremendously complex structure of the hospital suggests that the institution is likely to have a fairly high level of conflict among the various participants" (1977, pp. 178-179). Others also have suggested that evidence of conflict in hospitals is readily apparent (Byrne, 1974; Corwin, 1969; Levy & Loomda, 1973; Schulz & Johnson, 1971). However, although its existence has received attention and the need for improved understanding and management of conflict have been called for repeatedly, relatively little empirical research is available concerning conflict management in hospital organizations. For example, Georgopoulos in his classic review of hospital research reported the area of internal strain and conflict to be one of the least researched. He observed that "only three percent of the studies reviewed focused on problems of intraorganizational strain and conflict as the main dependent variable or principal area of interest" (1975, p. 158).

Schulz and Johnson (1971) in their review of research involving conflict in hospitals also found few empirical studies available in the area and concluded with a plea for more empirical research. They reported no empirical studies relating to relative frequency, severity, or source of interpersonal conflict. Specifically, they suggested a need for empirical studies to identify the impact of various conflict situations in the hospital environment. The present paper involving conflict in the hospital "purchasing" situation is one such attempt at satisfying that need.

The study addresses itself specifically to conflict in hospital purchasing decisions. An attempt has been made to shed light on the frequency, nature, and perceived causes of intraorganizational conflict in the hospital purchasing decision making process.

METHOD

The purpose of this research was to investigate empirically patterns of intraorganizational conflict surrounding equipment and material purchases in hospital organizations. Specifically, the study addressed itself to: (1) the frequency of such conflict; (2) the location of conflict; (3) perceived causes of purchasing-related conflict; and (4) the relationship of selected categorical variables to intraorganizational conflict.

In a recent study of general short-term hospitals, Dudley (1974) concluded that a majority of final purchase decisions are accounted for by the administrator and purchasing agent. Preliminary interviews with hospital personnel supported the finding and suggested that the parties (administrator and purchasing agent) would have the greatest insight into purchasing decision conflict due to their central roles in the purchasing process. Therefore, an attempt was made to obtain information from both parties within each of the sampled institutions.

A structured questionnaire consisting of seven major questions and multiple subsets was mailed to each of the subjects. Questions were designed to help define or describe key characteristics of the purchasing decision making process (e.g., location, influence, importance of criteria) and related perceived conflict.

The purchasing decision making process was defined for respondents as "choosing between alternative product types, brands, sources of supply, or even whether or not to purchase a product." Conflict was defined as "differences of opinion between individuals involved in the purchasing decision making process." Each question was asked for both routine (lower dollar value transactions) and nonroutine (higher dollar value transactions) purchasing situations (Kiser, Rao, & Rao, 1974). The following item from the original questionnaire illustrates the manner in which perceived conflict was measured for both routine and nonroutine purchasing situations:

> How frequently do differences of opinion exist between individuals involved in the purchasing decision making process in your hospital?

Routine Purchases (Low $ Value Transactions)	*Nonroutine Purchases* (High $ Value Transactions)
Always 5 4 3 2 1 Never	Always 5 4 3 2 1 Never

The questionnaires were mailed to both the administrators and purchasing managers of 90 general short term hospitals in a southwestern state. Administrator and purchasing manager responses were paired for each hospital in order that similarities and differences in perceptions could be compared on an item by item basis. Only complete sets (questionnaires from each party within a facility) of questionnaires were used in the final analysis. Of the participating hospitals, 56 (62 percent) returned usable sets of questionnaires. Findings from the questionnaire data were discussed with a representative sample of respondents in order to gain additional explanation for statistically significant findings.

The following categorical variables were treated as independent variables in testing the perceived frequency of intraorganizational conflict (dependent variable): (a) hospital size by bed size (≤ 99 beds, 100-199 beds, and ≥ 200 beds); (b) hospital profit orientation (profit versus nonprofit); (c) respondents' position (administrator vs. purchasing manager); and (d) purchasing situation (routine vs. nonroutine purchasing).

Data were analyzed using two parametric techniques, analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA). The Kendall-Stuart transformation technique was applied to the data in order to bring marginal distributions closer to normality. Parametric tests were considered to be more powerful than nonparametric techniques (Runyon & Haber, 1977; Parsons, 1978) and also more appropriate given the nature of the multiple interrelationships among respondents' answers (Clark & Schkade, 1974). Table 1 illustrates the ANOVA matrix upon which analysis of the independent (categorical) variables was based.

RESULTS

Univariate ANOVA computations of categorical variables for conflict frequency were performed and are presented in Table 2. The overall model R^2 was found to be .79, indicating that most (79 percent) of the variance of the dependent variable was explained by the categorical variables in the model.

TABLE 1
ANOVA Matrix of Categorical Variables

	Profit				Nonprofit				
	Administrator		Purchasing Manager		Administrator		Purchasing Manager		
Bed Size	Routine	Nonroutine	Routine	Nonroutine	Routine	Nonroutine	Routine	Nonroutine	Total
≤99	5	5	5	5	30	30	30	30	35
100-199	1	1	1	1	11	11	11	11	12
≥200	1	1	1	1	8	8	8	8	9
Total	7	7	7	7	49	49	49	49	56

TABLE 2
Univariate ANOVA Computations of Categorical Variables for Frequency of Conflict (Scaled Data)

Categorical Variables	*DF*	*F Value*	*PR>F*
Respondent's position	1, 52	4.47	.04*
Purchasing situations	1, 107	10.23	.01**
Hospital size	2, 50	2.40	.10
Hospital profit orientation	1, 50	1.70	.20
Overall model ($R^2 = .79$)	116, 107	3.36	.01**

*$p < .05$
**$p < .01$

Nonroutine purchasing situations were found to have a significantly greater frequency of conflict ($F = 10.23$, $p = .01$) than routine purchasing situations. The finding was supported by the overall survey MANOVA. Administrators perceived a significantly greater frequency of conflict than did their purchasing managers ($F = 4.47$, $p = .04$). Hospital profit or nonprofit orientation did not prove to be a statistically significant independent variable ($F = 170$, $p = .20$). The small number of for-profit hospitals in the population resulted in correspondingly small sample cell sizes. Therefore, caution should be taken in interpreting this particular finding even though the sample was representative of its population.

Frequency of conflict across hospital size categories was found not to be significantly different at the .05 level ($F = 2.40$, $p = .10$). However, a closer examination of the three mean scores revealed an interesting nonlinear pattern. Large hospitals (bed size ≥ 200 beds) and small hospitals (bed size ≤ 99) were found to experience a higher frequency of conflict than the medium size hospitals (bed size, 100-199 beds). Large hospitals experienced the highest conflict frequency, small hospitals the second highest level of conflict, and medium size hospitals experienced the lowest conflict level. Tukey's highly significant difference test (Steel & Torrie, 1960) was applied in order to determine which of the three mean scores were significantly different from each other at the .05 level. Large hospitals experienced a significantly higher frequency of conflict (scaled $\bar{x} = 1.12$) than either medium (scaled $\bar{x} = -.31$) or small (scaled $\bar{x} = -.18$) size hospitals. There was no significant difference between medium and small size hospitals in frequency of conflict.

DISCUSSION

Possible interpretations for each statistically significant finding are reported and discussed below. Information obtained from post-questionnaire interviews with respondents from nine of the sample hospitals was used in interpreting these findings.

Administrators perceived a greater frequency of conflict than did purchasing managers. This finding is explained in part statistically in that a greater frequency of conflict was found in nonroutine purchasing situations than in routine situations. Because administrators were also found to play a greater part (more authority and influence) in nonroutine purchasing situations than their purchasing managers, it seemed logical that they would be more aware of conflict.

Another explanation given frequently was that administrators had more contact with the board and medical staff than did purchasing managers. Respondents implied that hospital boards and medical staff personnel generated much of the perceived conflict. This explanation is partially supported in the hospital literature in that much of the perceived conflict in hospitals has been attributed to conflicts related to the medical staff (Fitzgerald, 1972; Schulz & Johnson, 1971; Perrow, 1965).

Conflict was perceived more similarly between administrators and their purchasing managers in hospitals in which the purchasing decision making process was decentralized and product evaluation committees were used. Such committees reviewed all brand changes and new-buy situations. Product evaluation committees reportedly consisted of representatives from all hospital departments with an interest in the purchase. By the time the administrator received the committee's recommendation most differences of opinion already had been resolved, thereby reducing the administrator's perceived conflict.

Conflict occurred more frequently in nonroutine purchasing situations (high dollar value transactions) than in routine purchasing situations (low dollar value transactions). A major explanation for this finding is that higher dollar value purchases produce more "intense opinions" from buying center members involved. Several different reasons were expressed for this phenomenon. Buying center members normally receive greater pressure from hospital equipment salesmen because profit margins generally are greater for higher dollar value items. Therefore, salesmen go directly to purchase-influencers. This, in turn, results in stronger purchase opinions from various members of the buying center.

Other possible explanations for the finding may be related to hospital budgets. Surprisingly, most of the hospitals sampled did not have an established budgeting system throughout the organization. However, those that had a system mentioned that most nonroutine purchases were outside the budget altogether. Therefore, the purchase itself required justification and greater interaction between buying center members, resulting in more frequent conflict. In addition, nonroutine purchases are less likely to be covered by pre-set rules (e.g., budgeting rules or norms). Thus a higher frequency of conflict logically would be experienced in such situations (Thibaut & Kelley, 1959).

Finally a higher frequency of conflict in nonroutine purchasing situations may be explained in that more people typically are involved throughout all levels of the organization, from board members to individual users, than in routine purchase situations. The greater the number of people and organizational levels involved in the decision making process (representing different perspectives), the greater the probability that disagreements will occur.

Conflict occurred more frequently in larger hospitals (≥200 beds), followed by small hospitals (≤99 beds). Conflict in medium size hospitals (100-199 beds) occurred least frequently. The conflict literature seems to support this finding. Corwin (1969) found that greater degrees of conflict existed in more specialized hospital organizations as well as in organizations with a greater number of levels of authority and heterogeneity among personnel. In addition, Rakich, Longest, and O'Donovan (1977) indicated that complex structure in hospitals appeared to be associated with higher levels of interorganizational conflict. These conditions appeared to be associated with conflict in the purchasing decision making process.

Increased specialization within the institution generally is accompanied by a greater number of specialized medical personnel (staff). Higher levels of conflict in larger hospitals may be traced to their specialized medical staff. Strong special interest groups (physician-specialists) may exert significant pressure on the purchasing decision making process. Power struggles over purchase dollars often result between the administrators and various specialty groups.

Smaller hospitals are not characterized by the complex, highly specialized structures found in larger health care organizations. However, small hospitals often are plagued by severe cash flow problems, thereby making purchase justifications difficult. Moreover, because general practitioners, rather than specialists, practice in the smaller facilities, higher patient revenues associated with the latter are not available to compensate for low revenues elsewhere. Finally, fixed costs on a per bed basis tend to be higher for small hospitals than for those in the 100 to 200 bed range.

As a result of cash flow problems, governing boards of smaller facilities tend to play a more active role in all resource allocations, including purchasing decisions. A number of conflicts reportedly occurred when administrators negotiated with their boards and medical staffs.

SUMMARY AND IMPLICATIONS

Through this research, the authors attempted to identify intraorganizational patterns of conflict surrounding the purchasing decision making process in hospitals. Sets of questionnaires completed by the administrators and purchasing managers in 56 hospitals revealed that: (1) significantly higher levels of conflict were associated with nonroutine purchases than with routine purchases; (2) administrators perceived greater frequency of conflict than did purchasing managers; and (3) larger hospitals experienced more purchasing related conflict than did medium and smaller size hospitals. No difference was found in the conflict levels of profit and nonprofit institutions.

The study found that conflict in purchasing situations was related to the level of spending involved. Nonroutine, high-cost purchases led to a higher frequency of conflict that was dealt with at the executive and governing board levels. Purchasing managers tended not to report high levels of conflict because (1) conflict related purchases (nonroutine) were resolved at the executive level and (2) day-to-day involvement with lower level disagreements on routine purchases were not perceived by them as conflicts. The finding that conflict was more prevalent in large hospitals than in medium and small sized hospitals, together with the perceived reasons for higher frequencies of conflict, revealed that although perceived causes of conflict might differ depending on bed size, conflict frequency was nonlinear in nature.

The findings are consistent with contingency theories of organization in that patterns of conflict associated with purchasing decisions may be traced to categorical (situational) variables that exist in various states within the hospital. Strategies for coping with conflict vary from institution to institution. However, recognizing the potential for conflict within an organization based on observed combinations of those variables should enable administrators to manage conflict proactively rather than reactively.

Two major directions for future research are apparent as a result of this study. First, additional research on an expanded sample size is needed to define further the effect of organizational size on conflict frequency. More specifically, is there an optimal bedsize range that would lead to maximum economies of scale relative to cost containment and conflict frequency within the purchasing decision making unit? Second, a larger sample including a greater number of for-profit hospitals should provide further evidence on the relationship of profit orientation and purchasing conflict frequency.

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The Impact of Flexitime on Employee Attitudes

WILLIAM D. HICKS
RICHARD J. KLIMOSKI
The Ohio State University

This investigation of flexitime did not support the traditional flexitime consequences for work satisfaction or leisure satisfaction. However, employees working under a flexitime schedule reported certain other improvements, including easier travel and parking, a smaller amount of interrole conflict, a greater feeling of being in control in the work setting; and more opportunity for leisure activities.

In Europe and to a somewhat lesser extent in the United States there has been the tendency to abolish fixed working hours and to adapt hours to individual desires and needs. One method is to follow a flexible work pattern called flexitime, flex-time, or flexible hours. Flexitime refers to a policy in which the traditional fixed times that employees start and finish the working day are replaced by a framework or set of rules within which employees are allowed some freedom to choose their starting and quitting times. Typically, flexitime is composed of core time and flexible time. Core time is that part of the working day when all full time employees are required to be present. Flexible time is a specified period before, after, or in between core times when employees can exercise designated options regarding their presence in, or absence from, the work place (Allenspach, 1972; Snyder, 1976).

Flexitime was originally implemented to reduce the car and motorcycle congestion around parking facilities, but it also had unexpected effects on employee attitudes. For example, some studies have reported an overall increase in leisure satisfaction and/or work satisfaction for employees who have experienced flexible hours (Evans, 1973; Partridge, 1973; Walker, Fletcher, & McLeod, 1975). Many researchers and practitioners support the general belief that flexible hours "work" and deserve to be implemented on a wide scale basis (Allenspach, 1972; Fields, 1974; Golembiewski, Hilles, & Kagno, 1974; Snyder, 1976).

Although published studies in this area have yielded favorable results, there has been a common tendency for the researchers to announce the goal or purpose of the study to their actual or potential respondents. That is to say that traditionally, the directions, title, questions, and/or statements from flexitime questionnaires contained the word flexitime or made reference to flexitime provisions in work hours (Evans, 1973; Walker et al., 1975). Although there is some merit in being straightforward in organizational surveys, this sensitization could easily lead to biased or misleading results. For example, if an employee wants to keep flexible hours (for whatever reason), he or she may respond to the questions or statements in such a way as to insure this, regardless of how he or she truly feels. Thus, the true impact of flexitime on employee attitudes would be difficult to assess. Therefore, in contrast to the traditional tendency, this study follows an administrative procedure that is designed to minimize prompting and bias in the questionnaire results stemming from demand characteristics.

The study examines the impact of flexitime programs on employee views toward leisure satisfaction and work satisfaction. However, it goes beyond this focus to examine other potentially important correlates of the flexitime experience. Based on other flexitime research and theory, it is hypothesized that alternative work hour schedules will have an impact on work-life relationships. Specifically, *it is hypothesized that employees with flexible hours will perceive and report an improved situation in traveling to and from work, parking and logistics; a smaller amount of interrole conflict* (stemming from work demands clashing with nonwork responsibilities); *a greater feeling of being in control or being an "origin,"* using de Charms' (1968) terminology, *in the work setting with implications for autonomy* (Cohen & Gadon, 1978; Summers, 1979); *and a greater opportunity for leisure activities* (Gordon & Elbing, 1971; Fleuter, 1975; Snyder & Burbach, 1976). Although the hypotheses for travel and opportunity for leisure activities have been touched on in the literature, the implications of flexitime for interrole conflict reduction and personal control have been largely ignored (Summers, 1979).

METHOD

Companies

Data were collected from two companies in Central Ohio. These organizations differ in a variety of factors including location, type of industry, number of employees, percentage of employees who are allowed flexible hours, the date flexitime was adopted, and the specific type of flexitime arrangement used.

Subjects and Design Overview

The employees who participated in this study were placed into one of two groups: fixed-hour and flexitime. The fixed-hour groups followed a preset time arrangement each day—8:00 a.m. to 4:30 p.m. The options for the flexitime groups differed somewhat for the two companies.

At company A (a manufacturer of computer based information systems), employees working under flexible hours began their work any time between 7:00 a.m. and 9:00 a.m. Each person was required to take a minimum one-half hour lunch period between 11:00 a.m. and 1:00 p.m. and then could leave any time between 3:30 p.m. and 6:00 p.m. after completing an eight hour work day. The decision to give employees flexible hours or not was based on presumed job demands (i.e., does an employee have to be at work at a fixed time to carry out his or her job properly?). All jobs were placed on flexitime if judged feasible.

At company B, which deals with all facets of the insurance business, employees working under flexible hours began their work any time between 7:00 a.m. and 9:00 a.m. Each person was required to take a one hour lunch period that was determined by the supervisors and then could leave any time between 3:30 p.m. and 5:30 p.m. after completing a seven and one-half hour work day. Employees in the flexitime condition were from departments that had been arbitrarily selected by management to participate in what was felt to be a pilot project. It was assumed that other departments would follow, given that no logistic, administrative, or job performance problems were discovered. There was no banking of work hours (i.e., transferring extra hours worked on a given day to another day, week, or month) or compensatory time off at either company.

A total of 130 employees (63 percent return rate) from company A participated by completing a questionnaire. Of these, 26 were classified as fixed-hour (65 percent return rate) and 104 were classified as flexitime (62 percent return rate). Similarly, a total of 80 employees from company B participated (98 percent return rate). (This high return rate was obtained, in part, because data were gathered from work groups who reported to an assembly room during company time to participate in a university sponsored study.) Of these, 26 were classified as fixed-hour (96 percent return rate) and 54 were classified as flexitime (99 percent return rate).

The jobs held by employees in the two organizations were quite diverse, including clerical, engineering, assembly, and quality control work. However, supervisory personnel were not included. Flexitime had been in effect at company A for 2½ years and it had been underway at company B for approximately 9 months.

For company A flexitime was implemented where it was technically feasible. Assignment would appear not to have been based on personal qualities (e.g., age) that might have been indirectly related to the dependent variables or on factors directly related to the dependent variables of interest (e.g., work satisfaction). For company B the flexitime group was created arbitrarily in order to determine the operational feasibility of the program. Thus, it seems unlikely that there was any potential bias as a result of personnel assignment to groups working under traditional versus flexitime programs.

More specifically, the two groups of employees at company B had similar working conditions and background data. The typical person could be described as a white female, between 16 and 29 years of age, high school graduate, single, performing clerical tasks that relate to insurance, and employed at the company for one or two years. A general profile for the typical worker from company A is not as easy to generate. But it can be stated that employees from the fixed-hour and flexitime conditions worked an equally heterogeneous mix of jobs. Although the fixed-hour group had slightly less education, the two groups were similar in tenure (median was 6-10 years with the company), marital status (married, with children), sex distribution, and ethnic background.

Questionnaire Administration

The employees who participated in this study were informed that it dealt with basic research designed to measure various attitudes (e.g., work satisfaction and leisure satisfaction). At no time was the term flexitime used in presentations or discussions. Moreover, this term or others relating to alternative work schedules did not appear on the questionnaires. This was done to reduce the degree to which subjects would be sensitized to the research hypotheses.

Questionnaire

The questionnaire used to collect data was divided into two major parts. The items from the first part measured employees' perceived quality of life, leisure satisfaction, work satisfaction, travel, parking and logistics satisfaction, interrole conflict (work vs. nonwork demands), being an "Origin" in the work environment, and opportunity for leisure activities. The items from the second part gathered background data.

Quality of Life—The quality of life measure or Index of Well Being used was developed by Campbell, Converse, and Rogers (1976). It included eight bipolar adjectives and a question about overall life satisfaction. The index or score was computed by using the formula developed by Campbell et al.

Work Satisfaction 1 and 2—The items that measured facets of work satisfaction were identical to those reported by London, Crandall, and Seals (1977). Work satisfaction 1 was computed by averaging the person's responses to these facet items. The items that measured overall (global) work satisfaction were written for this study. Work satisfaction 2 was calculated by averaging the person's responses to these overall items.

Leisure Satisfaction 1 and 2—The items that measured facets of leisure satisfaction were identical to those reported by London et al. (1977). Leisure satisfaction 1 was computed by averaging the person's responses to these facet items. Items that measured overall (global) leisure satisfaction were written for this study. Leisure satisfaction 2 was calculated by averaging the person's responses to these overall items.

Travel 1 and 2—Travel 1 was computed by averaging the person's responses on five specific travel, parking and logistics items (e.g., when arriving at work, I can get my preferred parking location; there is a great deal of traffic congestion when traveling to and from work).

Interrole Conflict 1 and 2—Interrole conflict 1 was computed by averaging the person's responses on seven specific interrole conflict items (e.g., my work hours interfere with the following nonwork activities or responsibilities: making and keeping personal appointments, engaging in social activities with friends). Interrole conflict 2 was obtained from the person's response to a single overall interrole conflict item (e.g., overall, my work hours interfere with my nonwork activities or responsibilities).

"Origin"—This was calculated by averaging the person's responses on three items written for this study based on the writing of deCharms (1968). The items reflected a feeling of being an "Origin" in the work environment (e.g., I feel that I have little control over things that happen to me at work).

Opportunity for Leisure—This was calculated by averaging the person's responses on two items written to tap this domain (e.g., the opportunities you have for leisure activities).

For all these measures/indices, the employees used a 7-point very satisfied to very dissatisfied scale or a 7-point strongly agree to strongly disagree scale to make their ratings. Some employees who completed the questionnaire failed to respond or wrote N/A (does not apply) for items that were included in Travel 1, Interrole conflict 1, etc. If a person made ratings on at least 80 percent of the items that comprised a measure/index, these items were averaged and treated as his or her score. The internal consistency reliabilities for all scales were high, the median being .86.

RESULTS

Hypotheses

In order to test the impact of flexitime on the various hypotheses, a MANOVA was performed. The dependent variables included the employees' ratings on Travel 1 and 2, Interrole conflict 1 and 2, "Origin," Opportunity for leisure, Work satisfaction 1 and 2, Leisure satisfaction 1 and 2, and Quality of life (Campbell et al., 1976). The significance criterion for the multivariate tests was based on the Wilks-Lambda criterion.

Before determining the extent to which the various hypotheses were supported, multivariate tests were checked for significance. It was found that the multivariate tests for the company main effect $F(13, 194) = 3.02$, work hour schedule main effect $F(13, 194) = 7.86$, and the company × work hour schedule interaction $F(13, 194) = 2.50$ were all significant at the .01 level. Having established the significance for the multivariate tests, it was then defensible to examine the univariate tests that focused on the dependent variables.

TABLE 1
Multivariate Analysis of Variance: Univariate *F*-Tests for Travel, Interrole Conflict, and "Origin" in the Work Environment

		Travel 1		*Travel 2*		*Interrole Conflict 1*		*Interrole Conflict 2*		*Origin*	
	df	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*
Company (Company A vs. company B)	1	5.34	3.40	12.40	4.39*	11.67	4.66*	7.04	1.75	4.30	3.14
Work hour schedule (Fixed-Hour vs. flexitime)	1	19.78	12.58**	2.93	1.03	28.63	11.43**	22.11	5.51*	21.70	15.83**
Company × Work hour schedule	1	3.37	2.14	4.91	1.74	3.75	1.50	.98	.24	2.38	1.73
Error	206	1.57	—	2.82	—	2.50	—	4.01	—	1.37	—

*$p \leq .05$
**$p \leq .01$

TABLE 2
Multivariate Analysis of Variance: Univariate *F*-Tests for Work Satisfaction, Opportunity for Leisure, Leisure Satisfaction, and Quality of Life

		Work Satisfaction 1		*Work Satisfaction 2*		*Opportunity for Leisure*		*Leisure Satisfaction 1*		*Leisure Satisfaction 2*		*Quality of Life*	
	df	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*	*MS*	*F*
Company (Company A vs. company B)	1	7.23	5.64*	29.76	11.32**	.78	.32	.02	.02	1.92	.81	8.24	1.26
Work hour schedule (Fixed-hour vs. flexitime)	1	.09	.07	2.48	.94	9.01	3.77*	3.23	3.45	6.38	2.69	.47	.07
Company × Work hour schedule	1	.01	.01	8.81	3.35	7.09	2.96	.10	.11	.01	.00	3.52	.54
Error	206	1.28	—	2.62	—	2.39	—	.93	—	2.37	—	6.50	—

*$p \leq .05$
**$p \leq .01$

The results for the hypotheses are presented in Tables 1 and 2. Analyses of the univariate tests showed that there was a work hour schedule main effect for Travel 1 and a company main effect for Travel 2. The flexitime groups expressed a significantly more favorable response toward the specific travel, parking and logistics items than did the fixed-hour groups, and company B's employees expressed a significantly more favorable response toward the overall travel, parking and logistics items than did the employees from company A. For interrole Conflict 1, there was a company main effect and a work hour schedule main effect. Company A employees reported a significantly smaller degree of interrole conflict than did the employees from company B, and the flexitime groups reported a significantly smaller degree of interrole conflict than did the fixed-hour groups. For Interrole conflict 2, there was a work hour schedule main effect. The flexitime groups reported a significantly smaller degree of overall interrole conflict than the fixed-hour groups reported. Also, there was a work hour schedule main effect for the "Origin" and opportunity for leisure measures. Compared to the fixed-hour groups, the flexitime groups reported that they had a significantly greater opportunity for leisure activities. (These effects also were obtained when the company was treated as a covariant, not an independent variable, in a multivariate analysis of covariance.) In general then, the predicted flexitime effects were found for these variables.

Unexpectedly, for the more commonly studied attitudes (i.e., work satisfaction, leisure satisfaction, and quality of life ratings), the results were not consistent with other flexitime research. There were no significant work hour schedule main effects or company × work hour schedule interactions for work satisfaction 1 and 2, leisure satisfaction 1 and 2, or the quality of life measure.

DISCUSSION

The most surprising finding of this study dealt with the lack of significant differences for the flexitime groups compared to the fixed-hour groups on the work satisfaction measures. Most of the other research that has focused on the flexitime→work satisfaction relationship found either that employees reported greater work satisfaction after being given flexible hours or that employees on flexible hours reported greater work satisfaction than did a comparable group of employees on fixed-hour schedules (Fields, 1974).

Possibly the predicted flexitime→work satisfaction relationship occurred initially but dissipated over time. However, this study involved data collection from two companies, and only one of the two had its program in effect for an extended length of time. So it is unlikely that an adaptation process was responsible for these nonsignificant results. An alternative explanation concerns the strong likelihood that work satisfaction is under the influence of factors more powerful than a work schedule. For example, there is ample evidence showing that such factors as pay, supervision, and specific work requirements have a major impact on employee attitudes. Thus, for the companies surveyed, these other factors may have "washed out" any flexitime effects. This possibility cannot be ruled out in this study (particularly since the flexitime scheme used by the companies under study is somewhat more restrictive than those reported by other investigations).

A third potential explanation is that this study used nonreactive measures in gathering employee attitudes. As previously stated, other flexitime research has frequently made reference to flexitime in the process of gathering data. In other words, employees knew that flexitime was the topic under investigation. Given that flexitime is a desirable company policy for employees because it does facilitate travel, reduce interrole conflict, and increase a sense of being in control in the work setting, it is quite understandable to find employees reporting that they like it more than dislike it. Flexitime is valued in this case not because it enhances work satisfaction, per se, but because it makes working a little bit easier. Thus, questionnaires used to gather employee attitudes about flexitime will yield favorable results if the link to flexitime is made obvious. When the link to flexitime is not salient, the traditional relationship may not occur.

Finally, although there were no significant work hour schedule main effects for the satisfaction measures in this study, flexitime did seem to have an effect on employee perceptions of travel difficulty, of interrole pressures, and of feelings of being in control in the work setting. These are potentially important aspects of the work experience. To the extent that these findings are generalizable, this may be reason enough to encourage a flexitime program. For company B, this apparently was the case. Its management intends to give the entire work force flexible hours in the near future.

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Career Success and Personal Failure: Alienation in Professionals and Managers

ABRAHAM K. KORMAN
URSULA WITTIG-BERMAN
City University of New York
DOROTHY LANG
Rutgers University, Newark

Expectancy disconfirmation, contradictory role demands, sense of external control, loss of affiliative satisfactions, and developmental life changes are proposed as significant factors in the personal and social alienation among professionals and managers. The research findings generally support the proposed framework.

It has long been assumed in U.S. society that professional and managerial careers are desirable because people in these positions are more satisfied in both the job and the nonjob aspects of their lives (Sarason, 1977). Among the reasons offered for this high degree of satisfaction are that professionals and managers have greater societal prestige, a greater range and challenge of job activities, and a greater autonomy in meeting the demands of their positions.

It is now becoming apparent that these assumptions may no longer be as justified as they have been in the past. Consider, for example, research studies such as the following:

1. Highly successful male executives in mid-life report doubts about the meaning of success, considerable self-doubt, disquiet over their careers (despite their success) and great value conflict (Henry, 1961);
2. A survey of several thousand managers who attended courses run by a well-known training association reported great degrees of personal and social alienation, that is, their careers were no longer meeting personal needs and they felt considerable alienation from the organizations for which they worked (Tarnowieski, 1973);
3. Interviews of successful young executives and their wives revealed great feelings of stress, a loss of personal alertness, and an increasing sense of meaninglessness in everyday activities (Bartoleme, 1972);

4. Significant numbers of successful managers in today's corporations report a loss of emotional feeling and a decreased ability to relate to others (Maccoby, 1976);
5. A study of one thousand middle-aged professionals and managers found that approximately 80 percent went through periods of intense frustration as early as their late 30's and that 15 percent never really recovered from this period (Schultz, 1974);
6. The belief that people higher in an organization are more involved in their jobs than are those lower in the organization is not supported by research evidence (Rabinowitz & Hall, 1977).
7. An intensive longitudinal study of 40 males found personal traumas, self-doubts and, frequently, major life changes at mid-life years regardless of previous level of occupational success (Levinson, Darrow, Klein, Levinson, & McBee, 1978).

These data suggest phenomena of societal, individual, and administrative significance. Because they are prominent, professionals and managers often serve as role models for others. Also, their activities are discretionary, which means that they often are free to act according to their own judgments. Both of these factors suggest that a positive outlook on work and life among these individuals would be desirable. However, to the extent that professionals and managers are experiencing their careers negatively and with much disquiet, their attitudes and behaviors will be affected negatively. As a consequence, attitudes and behaviors that are detrimental may be emulated by others and inhibit work or organizational effectiveness (e.g., professional aspirants, organizational subordinates, etc.). Important also are the implications for other aspects of society. Because great personal satisfaction has always been promised for success based on materialistic acquisition and/or competitive supremacy, negative attitudes and behaviors among the successful are unexpected and a great source of distress. Implicitly, the assumption is that individuals in these occupations should be satisfied. But they may not be. This makes them feel guilty (Sarason, 1977), it stimulates negative attitudes among those viewing this unexpected occurrence, and it may then lead to a depressing effect on those aspiring to become professionals and/or managers, a matter of clear societal concern. This paper is concerned with the factors that appear to be generating these negative attitudes among professionals and managers.

TERMS AND DEFINITIONS

The major focus in this paper is alienation, an emotionally related attitude considered to be conceptually and empirically distinct from job dissatisfaction. These are both negative attitudes, but they are not the same. *Job satisfaction/dissatisfaction* concerns how an individual views his job. "I like it/don't like it" is the essence of this attitude. *Alienation*, or the lack of it, constitutes one of the processes by which job satisfaction/dissatisfaction can occur.

Consider Manager A, who sees himself to be desirable and whose personal needs are considered by him to be worthwhile (because he is desirable). As a result, these needs need to be fulfilled by his job situation in order for him to be satisfied. Manager A would be called ***nonalienated*** because he is aware of what his personal needs are and he desires to have them fulfilled by his job. He is nonalienated and he can be either job satisfied or dissatisfied, depending on the level of need fulfillment provided by his position. Alienation and satisfaction (or dissatisfaction) are therefore not the same. Similarly, consider Manager B with low self-value and whose personal needs, because they belong to him, are not seen by him as being worth much. Because he does not evaluate his job on the basis of whether or not his needs have been met, he is as likely to consider himself satisfied when his personal needs have not been fulfilled as when they have been. Manager B is personally alienated because he does not use his own needs in making his behavioral choices and in evaluating his job satisfaction. Any job satisfaction that he may have (or not have) is likely to result from such factors as whether he believes he can get anything better or whether the job meets the standards of his friends or family.

Thus it is possible to be personally alienated and either satisfied or dissatisfied. Job satisfaction involves an attitude toward one's job. The feeling of alienation is one of separation or estrangement. Two types of alienation are suggested here. Personal alienation involves seeing a discrepancy between one's everyday behavior and one's self-image. It is believing that there is a "real self" inside the self and that the person who is behaving in the world everyday is not the "real" person. There is a split, a sense of personal alienation.

Social alienation is seeing the self as separated from others and as not having a common framework within which to interact. To be "alone" is the essence of social alienation.

In this research the focus has been on alienation, both personal and social. The reasons are several. First, although there is some research on alienation, it is believed that this research falls short on several counts. In some studies the term alienation has been used in the research reported, but an examination of the questionnaire items used suggests that the phenomenon studied has been job satisfaction (Nash, 1976). For reasons given above, the two phenomena are considered to be separate. Second, it is contended that there has been little research attention paid to the alienation of professionals and managers. Third, personal and social alienation are considered to be negative emotions of a significant nature. They generate feelings of sterility, impoverishment and emptiness, emotions of pathological significance (Korman & Korman, 1980). In addition, both personal and social alienation have been found to be significant in a motivational sense. In this research (Korman & Wittig-Berman, 1980), personally alienated individuals reported themselves to be more anxious in their behavior, to be less rational, and to be less likely to have a desire for self-actualization. Also, socially alienated women were marked by a desire to search for meaning in their lives and socially alienated males had a strong desire to be consistent and stable in their behavior. Thus, motivational processes related to personal alienation were found to be different from those related to social alienation. These patterns of relationships support the distinction the present research makes between these two types of alienation and also indicate a need to keep the concept of alienation distinct from job satisfaction.

Job satisfaction, in contrast to alienation, may be more ambiguous. Job satisfaction may describe a healthy striving individual who demands and obtains personal need satisfaction at work. However, the same term can also describe a withdrawn, apathetic person who wants, expects, and obtains little from his work. The first, it is believed, is a better situation than the second. Yet, both individuals can be described as having high job satisfaction. In a similar vein, a low-satisfaction, nonalienated individual who demands a more meaningful job is not quite the same as a nonsatisfied, alienated person who does not care.

THEORETICAL FRAMEWORK

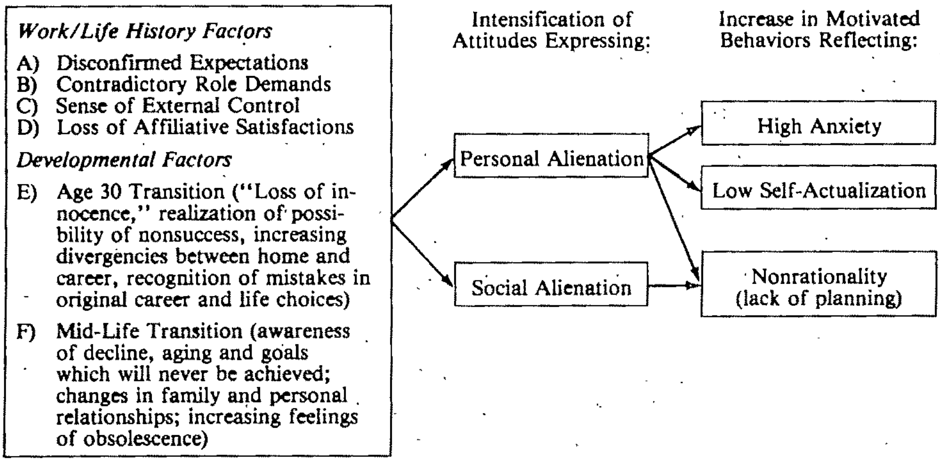
It is proposed that the experience of certain dimensions of business and family life and the realities of the aging process are major factors generating the difficulties seen among professionals and managers. These difficulties, as conceived here, involve attitudes of personal and social alienation that in turn may generate such changes in motivational processes as increased anxiety, lack of concern for self-actualization and decreased rationality. Personal alienation will generate each of these outcomes because these attitudes about the self imply that the individual feels a separation between the life he/she is living every day and the real self, that is, that which is not being expressed. The result, proposed here, is (a) a lack of interest in the real world and, therefore, less rationality; (b) a continuing expression of anxiety reflecting and justifying one's unwillingness to express the real self; and (c) an overall unwillingness to express the real self (i.e., a low level of self-actualization). Similarly, it is suggested that socially alienated individuals will be less rational because of their lack of interest in the world around them. Figure 1 summarizes these overall proposed relationships.

The research reported in this paper is concerned only with testing the attitudinal effects of the work/life history factors (A-D) listed in Figure 1. Factors E and F were not tested because of the need for longitudinal analyses, a design not possible here. Thus, the purpose of the present study is to investigate the extent to which work/life experiences, as described in Factors A-D below, contribute to a sense of personal and social alienation among professionals and managers.

A. Expectancy Disconfirmation

An expectancy disconfirmation is a cognitive state in which an individual realizes that he/she has been wrong in his/her orientation toward the

FIGURE 1
Career Success and Personal Failure: Alienation in Professionals and Managers


Work/Life History Factors
A) Disconfirmed Expectations
B) Contradictory Role Demands
C) Sense of External Control
D) Loss of Affiliative Satisfactions
Developmental Factors
E) Age 30 Transition ("Loss of innocence," realization of possibility of nonsuccess, increasing divergencies between home and career, recognition of mistakes in original career and life choices)
F) Mid-Life Transition (awareness of decline, aging and goals which will never be achieved; changes in family and personal relationships; increasing feelings of obsolescence)
Intensification of Attitudes Expressing:
Increase in Motivated Behaviors Reflecting:
Personal Alienation
Social Alienation
High Anxiety
Low Self-Actualization
Nonrationality (lack of planning)

world. Events and plans and people do not have the meanings supposed, and there has been a loss in the ability to plan and categorize oneself and others. What do people and plans mean if their acts do not match one's expectancies for them? The distress is great whether the disconfirmed expectancy concerns career desires (personal alienation), relationships to others (social alienation), or expectancies of others. Intrinsic to the concept of expectancy disconfirmation in work settings is the notion of equity. It is felt that the belief of "fair treatment" is a significant component of the expectations with which careers are approached. Violation of such equity beliefs (e.g., the better one is, the more the reward) is proposed to be a major source of alienation.

B. Contradictory Role Demands

This is a cognitive state which occurs when an individual realizes that some of the demands on him are contradictory and always will be, regardless of anything he may do. One result is that he realizes that he must inevitably sacrifice some of his personal desires, in terms of both individual career needs and interpersonal relationships. It is this loss of sense of self and of social relationships that makes contradictory role demands a major source of both personal and social alienation.

C. Sense of External Control (Powerlessness)

A major cause of alienation is the cognitive realization that one has been doing things because others said to. The perception that one has been manipulated and controlled leads to both a sense of personal alienation and a feeling of social alienation from others (these others have not been seeing the real self). In addition, if there is a belief that others also have been manipulated, social alienation increases even more (one has not been seeing the "real" others).

D. A Loss of Affiliative Satisfactions

The loss of affiliative satisfactions refers to perceived lack of having satisfied needs for interpersonal satisfaction. These desires are particularly difficult to meet in roles calling for great time commitment, extensive concern with tasks and accomplishments and energy commitment above normal job demands. Yet, these are job characteristics that are typical of professional and/or managerial roles (although whether it should be this way is open to question).

As a result of this commitment of many hours of work (including evenings and weekends) and frequent mobility (more often in the case of the manager), a feeling of loss of affiliative satisfactions, both from the individual's family and from other people on the job, is common. It is the recognition of one's inability to meet one's personal needs for affiliation and the consequent estrangement from others that it is believed generates personal and social alienation.

HYPOTHESES

Based on these considerations, the hypotheses tested by our research were as follows:

Hypothesis 1: Disconfirmed expectations are positively related to personal and social alienation.

Hypothesis 2: Contradictory role demands are positively related to personal and social alienation.

Hypothesis 3: Sense of external control is positively related to personal and social alienation.

Hypothesis 4: Loss of affiliative satisfaction is positively related to personal and social alienation.

RESEARCH DESIGN

Samples and Procedures

The research used two samples which differed significantly in terms of age and number of years since college graduation. Sample 1 consisted of an alumni group from one of the largest schools of business administration in the United States. Sample 2 consisted of evening M.B.A. students at two major universities in a large east coast city.

Alumni Sample—During the first two months of 1978, a set of questionnaires was mailed to 300 alumni (a probability sample of graduates from the classes of 1950 to 1962). Statistical analysis was undertaken when the response rate reached 90 (82 males and 8 females). Although this response rate of 30 percent is clearly on the low side, the data are believed to be useful for several reasons:

1) The response rate was actually fairly satisfactory, considering the length of the questionnaire (it probably took most respondents well over one hour to fill out all four questionnaires);
2) The number of requests for feedback indicated a great degree of interest;
3) The actual sample size (90) is a fairly good-sized one, considering the ages and income levels of this group. Table 1 provides a statistical breakdown of the demographics of the alumni sample. It indicates that although a statistically random sample of the alumni association was not achieved, responses did come from a group appropriate to the concern here.

M.B.A. Sample—All questionnaires were administered during regular class meetings. In all cases the courses were regular M.B.A. classes with a prerequisite of a bachelor's degree or higher. Data were collected from 111 M.B.A. students. Approximately two thirds of this group were in either a professional or managerial occupation. These individuals ($N=67$) were considered the group of interest for the analysis. Table 1 provides relevant demographic and descriptive data for this sample. As indicated, the two samples under study here correspond roughly to the two age groups for whom alienation is hypothesized to be salient (see Figure 1). However, for reasons noted earlier, the interest was not in testing age differences. Rather, the two samples studied here constitute replication samples for one another. The prediction was that they would show similar patterns of relationships because of the conceptual similarity of the two developmental stages they reflect.

TABLE 1
Demographic Characteristics of Samples

I. Sample One—Alumni Sample (N=90)		
Age:	Mean = 46.9	*SD* = 6.5
Sex:	Males = 82 Females = 8	
Education level:	College graduate = 100% Some graduate school = 63%	
Occupation:	97.8% managerial and professional	
Salary:	Median category = $30,000 to $50,000	
II. Sample Two—MBA Sample (N=67)		
Age:	Mean = 28.9	*SD* = 5.5
Sex:	Males = 42 Females = 25	
Education level:	College graduate = 100% Some graduate school = 100%	
Occupation:	100% managerial and professional	
Salary:	Mean = $18,249	

Measuring Instruments

There were two problems to be faced in the development of measuring instruments. First was the necessity to develop instruments that met the usual measurement criteria. Second, it was thought desirable to develop instruments that would reduce possible "method variance" problems by providing an alternative to total dependence on similar type objectively-scored measures for both the predictor and outcome variables.

Work/Life History Measure—The first step was to develop a measure to assess an individual's work and life history along each of the hypothesized causal factors of (a) disconfirmed expectations, (b) contradictory role demands, (c) sense of external control, and (d) loss of affiliative satisfactions. For each factor, several questionnaire items were constructed representing related aspects of such work and life experiences. The extent to which a specific type of work experience (such as "I have found that career success has brought fewer benefits than I once believed it would") was considered by the individual as self-descriptive was measured on a 5-point scale. The response categories and their scaled values were as follows: 1 = very nondescriptive, 2 = more nondescriptive than descriptive, 3 = neither descriptive nor nondescriptive, 4 = more descriptive than nondescriptive, and 5 = very descriptive. All questionnaire items were recoded in the positive direction and summed for each category. (The items comprising each category and the means and standard deviations for both samples are available from the authors.)

Table 2 reports the relevant alpha scale reliabilities for all measures computed for each sample separately. It is clear that the reliabilities are rather low in some instances and do not meet some of the traditional criteria. However, it is acknowledged that the whole question of reliability is a stormy one, and there are some theorists who propose that a better criterion is the development of systematic relationships with other variables and that only moderate reliabilities are desirable at best (Mischel, 1968). On this basis and also because these scales, although substantially related, did show considerable independent variance, the research proceeded. (These intercorrelations are also reported in Table 2.

Alienation Measures—For the measurement of personal and social alienation two procedures were developed utilizing different methodologies. These techniques were as follows:

1. An objectively-scored measurement questionnaire (titled Philosophy of Life) with separate subscales designed to measure personal and social alienation.
2. An error-choice measure consisting of (ostensibly) factual questions designed to measure respondents' knowledge of recent research about professionals and executives but which was actually a measure of personal and social alienation.

The individual questionnaire items comprising the personal and social alienation subscales of the philosophy of life questionnaire were evaluated

TABLE 2
Alpha Reliabilities and Interrelations of Subscales

I. Alpha Reliabilities

Variable	Alpha Reliability Sample 1 Alumni Sample	Alpha Reliability Sample 2[a] MBA Sample
Work/life history		
Disconfirmed expectations	.76	.68
Contradictory role demands	.47	.67
Sense of external control	.55	.41
Loss of affiliative satisfaction	.47	.38
Philosophy of life scale		
Personal alienation—philosophy of life scale	.60	.55
Social alienation—philosophy of life scale	.68	.76
Error-choice scale		
Personal alienation—Error-choice scale	.58	.37
Social alienation—Error-choice scale	.70	.42

II. Intercorrelations Between Subscales

	Contradictory Role Demands	Sense of External Control	Loss of Affiliative Satisfactions
Disconfirmed expectations	(.58***)[b] .62**	(.54**) .54**	(.61**) .21*
Contradictory role demands		(.47**) .56**	(.51**) .23**
Sense of external control			.(38**) .20*

[a] Alpha reliabilities for sample 2 are based on an N of 101. This includes the professionals and managers included in the later analyses as well as the full time students surveyed.

[b] Alumni sample intercorrelations are reported in parentheses.

on a 5-point scale with response categories ranging from 1 = very nondescriptive to 5 = very descriptive. All scores were summed for the analysis.

The test-retest reliability coefficient for this measure was established with a separate group of college seniors, all of whom were employed full time in either lower or middle management jobs. The coefficient was found to be .92, a satisfactory level considering the small sample size (N = 19) utilized in this test. The time interval between the two administrations was five weeks.

The personal and social alienation subscales of the error-choice measure present items in the form of a multiple choice test. For example, the individual is asked to check off the correct answer for a research finding such as "During the last five years, the number of executives who 'dropped out' of the business world has (1) declined, (2) remained the same, (3) increased somewhat, (4) increased sharply." All items are then scored and recoded in the direction of increased estimates of alienation among executives and professionals. A minor change in this scale was made between administrations to sample 1 and sample 2 in that some of the item stems referring to executives were replaced with other kinds of professionals in order to reflect a wider variety of occupations.

Table 3 represents data supportive of the construct-validity of the alienation measures. Reported there are 10 correlations testing the validity of the instruments; of these, 7 are significant in the predicted direction and none are opposite. Also useful in assessing the scales are the findings discussed earlier of the different motivational correlates of the two philosophy of life alienation scales. These findings support the argument that different, albeit related, constructs are being measured.

It is suggested, therefore, that despite their relatively low reliability, these scales have correlates reasonably consistent with their hypothesized characteristics and also that these correlates and relationships, although overlapping, are not the same. It also is suggested that it would be difficult to develop adequate theoretical justification for proposing that these measures are only alternative measures of job satisfaction. First, several of the relationships reported in Table 3 are hard to interpret in this manner (e.g., those with internal-control and purpose-in-life). Second, several of the correlations reported included samples of individuals who were not employed at the time. Third, there are correlations between all four alienation measures and a projective measure of job satisfaction for the alumni

TABLE 3
Construct Validity Analyses: Personal and Social Alienation Scales[a]

	Sample	*Scales*	*r*
I. Personal Alienation—Correlates			
A. Internal-external control (Rotter, 1966). High scores indicate inability to control own fate and a belief that one is similar to a pawn controlled by external events. The world is seen as a controlling influence overpowering the self.	1. Undergraduate students ($N=92$)	Personal alienation (PA)-philosophy of life	.31**
B. Attitudes toward business organizations. High scores indicate antagonism toward large business organizations, a belief in their lack of responsiveness to societal requirements, and a perception of them as violators of the environment and ethical norms.	1. Graduate business students ($N=97$)	PA-philosophy of life	.38**
		PA-error-choice	.17*
	2. Professors + Managers (subsample of above, $N=58$)	PA-philosophy of life	.24*
		PA-error-choice	.16
II. Social alienation correlates			
Attitudes toward business organizations	1. Graduate business students ($N=97$)	Social alienation (SA)-philosophy of life	.38**
		SA-error-choice	.08
	2. Professors + Managers (subsample of above, $N=58$)	SA-philosophy of life	.28*
		SA-error-choice	.00
III. Personal and Social Alienation			
Purpose-in-life test (Crumbaugh, 1968). High scores indicate a lack of meaning in one's life, an inability to relate to the world, to integrate one's needs with the world's demands.	Insurance executives ($N=51$)	PA + SA-philosophy of life	.31**

[a] All females ($N=8$) of the alumni sample were excluded.

sample. (Copies of the study reporting these data are available from the authors.) Although the latter measure is still experimental, it is of relevance here that the highest correlations obtained between any alienation scale and the job satisfaction measure was .32. Although significant, the level of this relationship does not, it is believed, indicate equivalent constructs.

It also is clear from Table 4 that the two methods used for measuring personal and social alienation have some variance in common but not a great deal. Clearly, they are measuring somewhat different phenomena, a not totally surprising result considering the different conceptual bases of the two methods. However, it should be kept in mind that the relationships shown are generally positive, indicating some overlap, and some are negative. For these reasons and because of the support for construct-validity shown in Table 3, it was decided to utilize both measures in the research but separately. (This procedure turned out to be supported by the findings of overlapping but also different empirical relationships.)

TABLE 4
Correlations of Alienation Measures

Correlations Between Variables[a]	*Alumni Sample*[b] *Total (N=82)*	*M.B.A. Sample*[c] *Total (N=105)*	*M.B.A. Sample Males (N=61)*	*M.B.A. Sample Females (N=44)*
1+2	.19*	.08	.04	.16
1+3	.66**	.54**	.36**	.70**
1+4	.22*	-.01	-.19	.35**
2+3	.21*	.07	-.02	.23
2+4	.56**	.17*	.19	.12
3+4	.44**	.17*	.13	.34**

[a] 1 = personal alienation—philosophy of life scale; 2 = personal alienation—error-choice scale; 3 = social alienation—philosophy of life scale; 4 = social alienation—error-choice scale.

[b] All females ($N=8$) were excluded.

[c] See footnote a, Table 2.

*$p<.05$

**$p<.01$

RESULTS

Table 5 presents the zero-order correlation coefficients between the four life experience factors and personal and social alienation as measured by both the philosophy of life and error-choice scales. For the philosophy of life scale, all the correlations are significant in the predicted direction at the .01 level or higher for all four life experience factors in both the alumni and M.B.A. samples.

Correlations for the error-choice scales are generally lower than for the philosophy of life scales, and they show different patterns for the alumni and M.B.A. samples. For the alumni sample, the correlations are significant in the predicted direction for five of eight cases and are positive but nonsignificant in the other three. For the M.B.A. sample, however, none

TABLE 5
Correlations Between Life Experience Factors and Personal/Social Alienation

	Philosophy of Life Scale				*Error-Choice Scale*			
	Alumni Sample[a] (*N*=82)		*M.B.A. Sample* (*N*=67)		*Alumni Sample*[a] (*N*=82)		*M.B.A. Sample* (*N*=67)	
	Personal Alienation	*Social Alienation*	*Personal Alienation*	*Social Alienation*	*Personal Alienation*	*Social Alienation*	*Personal Alienation*	*Social Alienation*
Disconfirmed expectations	.59**	.52**	.53**	.44**	.28**	.24*	.09	.04
Contradictory role demands	.42**	.36**	.38**	.47**	.27**	.16	.02	.05
Sense of external control	.48**	.38**	.36**	.44**	.10	.04	.12	.03
Loss of affiliative satisfactions	.57**	.48**	.50**	.46**	.23*	.20*	−.02	−.22*

[a] Females ($N = 8$) were excluded.
*$p < .05$
**$p < .01$

TABLE 6
Regression Analyses[a]

	Multiple R	Beta Weights				d.f. for Regression
		Disconfirmed Expectations	Contradictory Role Demands	External Control	Loss of Affiliative Satisfactions	
Philosophy of life scale						
Alumni sample						
Personal alienation	.65**	.39**	n.s.	n.s.	.34**	(2,79)
Social alienation	.56**	.35**	n.s.	n.s.	.27*	(2,79)
M.B.A. sample						
Personal alienation	.66**	.43**	n.s.	n.s.	.42**	(2,61)
Social alienation	.60**	n.s.	.40**	n.s.	.39**	(2,60)
Error-choice scale						
Alumni sample						
Personal alienation	.28**	.28**	n.s.	n.s.	n.s.	(1,80)
Social alienation	.24*	.24*	n.s.	n.s.	n.s.	(1,80)
M.B.A. sample						
Personal alienation	n.s.	n.s.	n.s.	n.s.	n.s.	
Social alienation	n.s.	n.s.	n.s.	n.s.	n.s.	

[a] Females ($N=8$) of the alumni group were excluded.
*$p<.05$
**$p<.01$

of the error-choice correlations is significant. A possible reason for this finding may be the confounding effect of the sex differences for this sample, which is discussed below.

Table 6 shows step-wise regression analyses predicting personal and social alienation on the basis of the four life experience factors for both the alumni and M.B.A. samples. The regressions for the philosophy of life scale indicate quite strongly the importance of loss of affiliative satisfactions. This life experience factor has a significant beta weight for both samples. For the alumni sample, loss of affiliative satisfactions also has the largest beta weight for both the personal and social alienation criteria. Only external control fails to achieve a significant beta weight in at least one of the regressions, but neither of the other two is as consistently significant as loss of affiliative satisfactions.

For the regressions based on the error-choice scale, contradictory role demands and disconfirmed expectations are each significant in one of the regressions for the alumni sample. For the M.B.A. sample, neither of the error-choice regressions resulted in a significant multiple correlation coefficient.

Table 7 presents the correlations for the work/life history factors with the philosophy of life scales for males and females separately in the M.B.A. sample. It can be seen that these results are generally consistent with those presented in Table 7 and that there does not seem to be any important sex interaction. However, such an interaction does appear in Table 8, which presents correlations between the error-choice scales and the life experience. For the females, the social alienation correlations are consistently positive, achieving significance in three of the four cases. In addition, one of the correlations for personal alienation is significantly positive. For the males, however, the correlations are mostly nonsignificant, although one correlation is significant in the opposite direction from that predicted.

Separate step-wise regression analyses also computed for males and females in the M.B.A. sample show a similar pattern with respect to the

TABLE 7
Correlations Between Work/Life History Factors and Philosophy of Life Personal/Social Alienation for Males and Females in the M.B.A. Sample

	Personal Alienation		*Social Alienation*	
	Males (N=40)	*Females (N=24)*	*Males (N=40)*	*Females (N=24)*
Disconfirmed expectations	.42**	.66**	.35**	.48**
Contradictory role demands	.35**	.39*	.65**	.23
Sense of external control	.35**	.33	.40**	.40*
Loss of affiliative satisfactions	.40**	.66**	.25	.66**

*$p<.05$
**$p<.01$

TABLE 8
Correlations Between Work/Life History Factors and Error-Choice Personal/Social Alienation for Males and Females in the M.B.A. Sample

	Personal Alienation		*Social Alienation*	
	Males *(N=40)*	*Females* *(N=24)*	*Males* *(N=40)*	*Females* *(N=24)*
Disconfirmed expectations	.21	.03	-.18	.41*
Contradictory role demands	.01	.17	-.14	.38*
Sense of external control	.01	.47**	-.17	.40*
Loss of affiliative satisfactions	-.12	.27	-.37**	.07

*$p < .05$
**$p < .01$

error-choice scales. For the social alienation scale, the only significant factor for females is contradictory role demands, which is significant in the positive or predicted direction (beta = .415, $p < .05$). For the males, however, the only significant life experience factor is loss of affiliative satisfactions, which is significant in the negative or *opposite* direction from the prediction (beta = -.374, $p < .05$). It is believed that these results may reflect, due to the subtle characteristics of the error-choice measure, different sets of pressures on these younger career-oriented male and female managers.

DISCUSSION

Overall, the results of the research suggest considerable support for the hypotheses as far as the philosophy of life scales are concerned. The results for the error-choice scales, although somewhat supportive, are more complex and are discussed separately.

Of the four factors examined, the loss of affiliative satisfactions consistently showed itself to be the most significant. This is highly important in two ways. First, it suggests that the female in society, moving today from a high affiliation orientation to more achievement concern, is not the only one who is changing. Males also seem to be changing, even the males who typify the traditional, achievement-oriented, technologically-accepting male, that is, the managers of organizations and the professionals of society. To admit to a loss of affiliation and to be concerned with it does reflect a changing world, a world which the leadership of our organizations needs to recognize.

Such realization, however, does not guarantee an ability to deal with this problem, and this is important to recognize. The fact is that the loss of affiliative satisfaction as a factor in alienation points to the achievement versus affiliation conflict in contemporary life, a conflict that is enduring and is difficult to deal with regardless of organization or society. Many companies today, faced with the executive who will not relocate because of family pressures and the two-career families who insist on company accommodation of their needs, will testify readily to the difficulty of reconciling the affiliation-achievement conflict. Yet, difficult or not, the conflict is increasingly a part of the everyday life of U.S. society. More and more people will not give up "everything" for the job and organizations will need to learn to accommodate.

The problem for management is not quite as severe when the next most important predictor, disconfirmed expectations, is considered. This is an area in which much can be done and increasingly is done. The realistic job preview (Wanous, 1973), which focuses on an adequate description of both the "goods" and "bads" of the position being recruited for, is now a fact of life. (As a matter of fact, this technique is now also being used by some colleges for recruiting students.) The research reported here supports the continuing utilization of such a technique. In addition, it may also be useful to extend this technique to the potential employee's family. Because they also will be affected by the individual employee's career, they need to know what to expect. Perhaps, also, if such an extension were made, the loss of affiliative satisfaction and the resulting alienation would be less likely to occur. However, there is a question involved here that needs to be kept in mind, and that is that the providing of realistic job expectations will not necessarily make the choosing of occupations easier. On the contrary, it might make it more difficult. Not all people handle an "open society" very well even if there is a fairly good likelihood that eventually decreased alienation will be the outcome.

Contradictory role demands appear to have some significance as a factor in alienation but not as great as hypothesized. One reason for this may be that managers and professionals start to accommodate to the contradictions of life earlier than at the ages of those studied here and that they have adapted partially by this time. Another possibility is that the major problem at these ages may not be contradictory role demands but rather role ambiguity. (The authors are indebted to an unknown reviewer of an earlier draft of this paper for this suggestion.) The individual at these ages may not be in conflict as much as in a state of ambiguity. Where does an individual go once his original choice has turned bad (i.e., the age-30 change)? When the original life has reached its zenith and when the mid-life crisis has erupted? What choices are really available? And possible? To what new life can one attach the self? Perhaps it is in those questions that major sources of alienation can be identified.

The lack of significance for the external-control factor in the regression analyses is perhaps the most surprising finding of the research. External-control and its effects is one of the most frequently examined variables in organizational research, and it is often found to be of major significance in reporting on performance and job-related attitudes. A number of explanations are suggested. Margolis (1979) has recently examined how managers in one large organization have been so socialized into an acceptance of organizational demands on them that they are almost unaware of what has occurred. This internalization is increased even more by the perceived massiveness of the organization relative to them and their resulting impotence to overcome the problem. On the other hand, problems with their family life are too salient to be ignored and their family also demands that they pay attention and deal with the situation. On the other hand, it may also be that individuals who wish to become managers are socialized into acceptance of external control during their childhood and adolescent years and that the organization only confirms and reinforces what has already been accepted. For managers, then, their alienation comes because their acceptance of external control has not brought the life they expected. Research investigations testing this explanation as well as its generalizability to professionals are needed.

The findings for the error-choice scales are more complex, particularly for the M.B.A. sample. Although the correlations are moderate for the alumni sample, they are generally significant at least as far as personal alienation is concerned. For the M.B.A. sample, however, the findings differ, showing a reasonably strong pattern for social alienation for the females and showing a neutral or negative pattern, if anything, for the males. An explanation that may account for these findings centers around two propositions. First, the error-choice measure picks up attitudinal variables different from those of the philosophy of life scale, perhaps more subtle. (This may explain the generally low intercorrelations.) Second, some males become less "macho" as they age. If this is so, it is predicted that younger males would be more disinterested in affiliation and view it as a barrier to achievement (hence, the negative weights). However, they are more willing to both accept and express feelings in these areas as they age (hence, the positive weights for the older alumni sample). On the other hand, career-oriented females still suffer from contradictory role demands in the areas of achievement and affiliation, and this is what the results reflect.

There is, of course, one problem with this explanation and that is that loss of affiliative satisfactions did show a positive beta weight for the M.B.A. sample males for the philosophy of life scale. The first proposition above suggests that the two personal alienation scales, having considerable independent variance, may be reflecting different types of self-awareness and emotions. This explanation, however, will need to be dealt with in further research.

There are also two other factors that need to be explored. The first concerns the relative contribution of nonwork versus work experience affecting the significance of each of the major factors cited. The second factor covers the role of individual difference factors (e.g., age, personality variables, etc.) in influencing this phenomenon relative to the factors studied.

Focusing on the first question, such factors as contradictory role demands, disconfirmed expectations, sense of external control, and loss of affiliative satisfaction may result from experience on the job or from nonwork experiences that depend on or derive from career success. Which factors are most significant? It is submitted that this is an important question both theoretically (if one is to begin to understand the significance of work experience and/or success in modern life) and practically, if one wishes to develop remedial interventions for this phenomenon. To illustrate, take the disconfirmed expectations factor, a variable which Sarason (1977) has proposed as being of great significance in influencing dissatisfaction and alienation among professionals and which was also found to be of significant importance in the present research. What are the key factors involved here? Is it because the manager, or professional, expected great derivative satisfactions (e.g., a better family life) as a result of his career success? Or did he expect continuing job excitement, increasing power, etc.? Are both involved? Korman and Korman (in press) have suggested both factors but have left open the question of differential significance. Remedial interventions depend on the answer.

One possibility is that the differential significance of work and nonwork influences may be a function of individual difference variables such as age or personality. What is the influence of such phenomena as "seeing the self as over-the-hill," "seeing children as reality rather than unfulfilled dreams," etc.? What is the significance of the age-30 change (Figure 1)? The influences of other such personality-related factors as tolerance for ambiguity, optimism-pessimism, and capacity for growth also should be examined. All of these, and others, would seem to be of possible usefulness as factors influencing this phenomenon, and they might also operate relatively independently of experience factors.

These questions are only part of what is seen as important research questions for the future, questions that need to be answered if this problem is to be dealt with on societal, organizational, and individual levels. It is believed that interventions are possible. However, their characteristics and fruitfulness will be a function of the completeness and vigor of the research findings upon which they are based.

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The Utilization of Staff Member Intelligence and Experience Under High and Low Stress[1]

EARL H. POTTER, III
U.S. Coast Guard Academy
FRED E. FIEDLER
University of Washington

An investigation on determinants of effective staff work showed that stress in the relationship between the staff officer and the superior constitutes an important moderator variable. When stress with boss was high, experience correlated positively but intelligence correlated negatively with performance evaluations. Intelligence was uncorrelated with performance when the individual reported relatively low stress with his boss.

Recent history dramatically demonstrates the importance of top White House staff members in determining the fate of the President and of the nation. Among the names that readily come to mind are Harry Hopkins, H. R. Haldeman, Henry Kissinger, and Jody Powell. And although many staff jobs are quite routine and not all staff officers wield such influence, most top executives of a major corporation or military command could not operate without appropriate staff support. Published papers dealing with staff functions are primarily descriptive and analytical in nature. A search of the literature has revealed no quantitative studies of factors that determine the effectiveness of staff personnel. This neglect reflects not only a greater interest in line management, but also the difficulties in assessing staff performance. The present study examines the contribution of experience and intelligence, two factors that have been assumed to contribute to the performance of staff personnel.

By definition, individuals in staff positions exist for the purpose of assisting, advising, and representing the superior in whose name they speak. Their typical functions consist of collecting, analyzing, and evaluating

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information, preparing reports and drafts for the superior's approval, and performing routine administrative support functions for which the line manager is responsible. Staff effectiveness is defined, therefore, as the ability to assist the line manager to perform well. Some of this work tends to be intellectual, requiring creativity, judgment, and analytical ability. It therefore is not surprising that intelligence and experience should be highly prized attributes of staff personnel.

There is ample reason for questioning, however, whether intelligence and experience contribute directly to the effectiveness of the staff officer. Past research has certainly failed to support the equally plausible assumption that the intelligence and experience of leaders consistently benefit their performance. In a series of 13 studies, Fiedler (1970) found a median correlation of -.12 between years of leader experience and leader performance, and various extensive reviews (Stogdill, 1974; Mann, 1959; Ghiselli, 1966) have reported correlations between leader intelligence and performance that are generally positive but very weak. On the other hand, a multiple screen model, described by Fiedler and Leister (1977), has shown that intelligence does contribute to leader performance, provided the leader's motivation and experience are high, and relations with his immediate superior and group are good. In a test of this model, stress with boss turned out to be the most promising single moderator of the relationship between leader intelligence and leader effectiveness; job stress had relatively little effect. The present paper extends this research to the work of the staff officer.

The conceptualization of stress used in this study is based on McGrath's (1976) work, which considers stress as the result of two divergent forces that act on the individual. These are the demands on the individual and the availability of resources to meet these demands. As these demands begin to outstrip the individual's resources, the individual will experience a corresponding increase in stress.

There are, of course, many different types of stress in organizational life which affect the individual. Based on previous analyses by Curtis and Borden (1977) and previous research by Fiedler and Leister (1977), it appears likely that stress with the immediate superior is particularly important in the utilization of leader intelligence and experience. This type of stress should be even more important in relations between the staff officer and the immediate superior. First, the staff officer has relatively few, if any, subordinates under his or her immediate control. Second, because many staff positions, for example, administrative aide, are only vaguely defined, the immediate superior not only determines the task but also the standards by which the task is evaluated. This places the staff officer in a position that makes him or her highly dependent on the immediate superior. A stressful relationship with this powerful person, therefore, is apt to have a major impact on the subordinate staff officer's ability to function. The generalized level of stress that characterizes the job, itself, has been more extensively examined in the literature (Bermak, 1977; Burke, 1976; Cooper & Marshall, 1976; Gupta & Beehr, 1979; Singleton, 1977). It appears to play a considerably less important part in the use of intelligence and experience. The main concern in this paper, therefore, is with the stress that the staff member perceives in the relationship with the immediate superior.

The literature in experimental psychology has long pointed to the effects of stress and anxiety as narrowing the individual's ability to think along new lines and as inhibiting creativity (Lazarus, 1966; Pelz & Andrews, 1966). This accords with the well-known observation that research teams or academic departments become unproductive when there is interpersonal stress in the group (Blau, 1954) and that creativity requires a contemplative environment.

On the other hand, stress tends to improve performance on previously overlearned tasks and tasks involving behaviors acquired through rote learning and experience. For this reason, such emergency crews as fire department companies and emergency medical teams are drilled to the point at which their responses under stress or crisis conditions become nearly automatic. This is illustrated by a study that compared the performance of recruits and experienced noncommissioned officers on military tasks under stress-free and relatively stressful conditions. The recruits performed better under the former, the experienced sergeants under the more stressfull conditions (Berkum, 1964). It is expected, therefore, that experience will be more beneficial under stressful than nonstressful conditions. Hence,

> *Hypothesis 1. The intelligence of staff personnel will be positively correlated with performance under stress-free conditions but uncorrelated or negatively correlated when stress with the immediate superior is high.*
>
> *Hypothesis 2. The experience of staff personnel will be uncorrelated with performance when stress with boss is low but positively correlated when stress with the immediate superior is high.*

The effect of stress on the use of intelligence probably will be more marked on the performance of tasks that require resourcefulness and intellectual effort than on tasks that are intellectually undemanding. Experience, on the other hand, would be most beneficial on tasks that have been performed in much the same way on numerous occasions in the past. Hence,

> *Hypothesis 3. The staff member's intelligence will be more positively correlated with performance when stress with boss is low and the task is relatively unstructured and ambiguous rather than highly structured.*
>
> *Hypothesis 4. The staff member's experience will be more positively correlated with performance when stress with boss is high and the task is relatively structured rather than unstructured.*
>
> *Hypothesis 5. The staff member's intelligence will be more positively correlated with performance under low stress on tasks that require high intellectual effort than on tasks that require relatively little intellectual effort.*

Hypothesis 6. The staff member's experience will be more positively correlated with performance under high stress on tasks that are relatively routine and require relatively little intellectual effort.

It is important to note that the six hypotheses propose that it is stress with the boss in particular and not stress in general that moderates the relationships of experience and intelligence to performance. Therefore, for comparison purposes, analyses based on job stress will also be presented for each of the tests indicated by the six hypotheses.

METHOD

Subjects

The study utilized officers, petty officers, and civilian employees of a U.S. Coast Guard Regional Headquarters who served in responsible staff jobs. These are here defined as positions at the supervisory level that support the work of the line command. Participation in the study was voluntary. Of the 133 individuals in this category, only 1 military and 2 civilian staff members refused to participate. Of the remaining 130 subjects (96 military and 34 civilians), 9 were women and all but 3 were Caucasians. Jobs ranged from the chief of staff and the chiefs of such departments as personnel, supply, communications, and operations (officers with rank of Coast Guard Captain) to petty officers who served as technical advisors to ships in the region or managed subsections of one of the staff departments. The ages of subjects ranged from 23 to 64 years, and the government service from 15 months to 38 years.

Questionnaires and Tests

Questionnaires and intelligence measures were administered to subjects in groups of approximately 25. Administration required about 1½ hours. Because of other duties, 12 persons were unable to attend the testing sessions, and completed the questionnaires on their own time, but no intelligence measures could be obtained for them. Also missing are performance evaluations for 16 staff members whose superiors refused to rate them. Analyses in this study are based on all available data; complete data were obtained for 102 of the 130 subjects who participated in the study. These did not differ on available measures from those for whom complete measures were not obtainable.

Intelligence—Intelligence was measured with the Wonderlic (1973) personnel test, a 50-item scale requiring 12 mintues ($\bar{X} = 21.77$, test-retest reliabilities are reported as .82 to .94). The mean and standard deviation (*SD*) for this sample were 28.57 and 5.72, respectively, with scores ranging from 14 to 43. The corresponding Wechsler Adult Intelligence mean is approximately 113.

Subjects were classified as having low intelligence if their score fell in the lower half of the distribution (test score less than 25, $\bar{X}=22.26$). Those falling into the upper half of the same distribution were classified as having high intelligence (score of 26 or above). The mean for this group was 31.56, roughly equivalent to a Wechsler Bellevue score of 118.

Experience—Because the Coast Guard is a career service that rotates all military personnel between line and staff positions in order to provide a comprehensive knowledge of the organization, personnel are likely to draw on their previous line as well as staff experience in performing their jobs. For example, the chief of the operations division will evaluate recommendations on vessel deployment in light of his own command experience. High experience was defined as time in service at or above the median of 207 months (17.25 years); low experience was defined as less than 207 months.

Task Structure—A 10-item scale developed by Fiedler, Chemers, and Mahar (1976) indicates the degree to which the task has clearly stated goals, a prescribed method, one rather than many possible answers and methods for determining whether the job was done right. Scores obtained for a wide variety of tasks indicate that this scale is valid. Examples of scale items are: Is there a blueprint, picture, model, or detailed description available of the finished product or service? Is it obvious when the task has been finished and a correct solution has been found?

The 10-item scale has a split-half reliability of .74, with scores ranging from 2 to 19 and a median of 12.88. Jobs with a task structure score of 12 or less were defined as low in task structure ($N=58$); those with scores of 13 or above were classified as high in task structure.

Job Functions—A list of 10 of the most common Coast Guard staff functions was developed in cooperation with Coast Guard officers. Each subject then was asked to indicate the proportion of time spent in performing each function. These were: (1) routine administrative paperwork, (2) project/engineering design, (3) supervising subordinates, (4) evaluating the performance of field units, (5) training and/or providing technical advice/assistance to field units, (6) advising superiors or preparing information for decisions to be made by a superior, (7) making policy decisions that affect others besides those in the immediate work group (including information collection), (8) providing logistic or administrative support for staff and field units, (9) representing the Coast Guard to the public (attending legislative hearings, public speaking, liaison functions with other agencies, public information services), and (10) attending informational meetings (e.g., staff conferences).

Each of these functions was rated by three Coast Guard officers on the approximate degree to which the particular function requires intellectual effort. There was good agreement among raters that this was the case for policy advising, the evaluation of field units, and assisting in making policy decisions. There also was agreement that such functions as routine administrative paperwork, public representation, and training of field units required relatively less intellectual effort.

Stress with Boss (StBs)—Based on previous research by Curtis and Borden (1977), a behavior description scale was used. This consisted of 10 items from Stogdill's (1963) Leader Behavior Description Questionnaire XII and 24 additional items, which were suggested by a pretest. Each staff member indicated on a 7-point scale how much stress or tension he feels on his job as a result of his boss behaving in the given manner (e.g., sets short deadlines, refuses to give needed information, etc.). A varimax analysis of this scale identified four factors with eigenvalues above 1. However, the first factor accounted for 75 percent of the total variance, and the StBs score was, therefore, based on the sum of six items from the first factor, with loadings between .56 and .72, viz.,

He acts unfriendly or unapproachable.
He does not inform me of what he expects of me.
He does not permit me to use my judgment in solving problems.
He becomes unpleasant with me when he is under pressure.
He does not notify me of changes.
He does not provide me with needed information for performing my job properly.

The range of scores on this scale was from 6 to 34 with a mean of 15.8 (*S.D.* = 8.42) and split-half reliability of .92.

The items on this scale primarily indicate that the boss is perceived as withholding support and information. However, as items with lower loadings showed, this was coupled with a demand for a high level of performance. Thus, the scale describes a boss who creates stress by demanding greater output while at the same time withholding support and assistance. High boss stress is defined by a score of 16 or higher, low stress, by a score of 15 or below ($\bar{X}=24.81$, $SD=5.09$, and $\bar{X}=10.28$, $SD=3.48$, respectively).

Job Stress (JbSt)—The measure of stress on the job was obtained by asking the individual to fill out a single scale to "rate your present job on how much overall stress it places on you."

No Stress :__:__:__:__:__:__:__: Extreme Stress
1 2 3 4 5 6 7

The mean and standard deviation of scores on that scale were 4.20 and 1.50, respectively, with a median of 4.30.

Performance Evaluation

As indicated above, staff member performance was rated by the immediate superior. Because the staff member functions primarily in support of his or her superior, the true measure of staff performance must reflect the individual's contribution to overall organizational goals by increasing his or her boss's performance effectiveness. The boss's satisfaction with staff member performance thus seems the most valid measure of staff member performance in this study.

The performance scale was developed by Bons (1975) and modified by Borden and Leister (1977). The present form consists of 16 items (Potter, 1978) and has a split-half reliability of .96 and a single factor.

Supervisors were asked to rate their subordinates on 8-point scales "in comparison to all persons you know in a similar position." Scale points were defined as indicating from 8 to 1, respectively, the following percentiles: *8*=99th, *7*=98-97, *6*=96-95, *5*=94-90, *4*=89-80, *3*=79-50, *2*=49-25, *1*=24-0 percentiles. Illustrative items are:

> The way he carries out administrative actions required of him in accordance with published directives and standard procedures.
>
> His consistency in setting high standards of performance.

The summed values of the 16-item scale ranged from 33 to 126, with a median of 82.5.

Intercorrelation Among Variables

The main variables of this study were the staff member's intelligence, experience, perceived task structure, boss stress, job stress, and the superior's evaluation of the staff member's performance (Table 1). All intercorrelations were small, and only two were significant. A significant correlation was found between intelligence and task structure, indicating either that more intelligent individuals perceived more complexity in their tasks or that they were assigned to more complex tasks. Of these, the former appears more likely for several reasons. First, officers or enlisted personnel are almost never assigned to a job on the basis of their intelligence scores. Second, the tendency for more intelligent people to perceive more task complexity has been reported elsewhere (Bons, 1975; Uhlman & Saltz, 1965). A significant correlation also was found between task structure and job stress, indicating that a small but significant proportion of job stress is related to the complexity of the job. It is particularly noteworthy that performance ratings in this study were correlated neither with boss stress (-.07), intelligence scores (-.02), nor with experience (.18). On the average, therefore, the more stressed, less intelligent, and less experienced staff officers performed as well as did those with relatively low stress, high intelligence, and high experience (Table 1).

RESULTS

Intelligence and Staff Performance

Hypothesis 1 stated that the correlation between staff member intelligence and rated performance will be positive under low boss stress. This hypothesis was not supported, although the correlation of intelligence and boss stress was in the expected direction (.16, $N=60$, ns). Under conditions of high boss stress, however, the intelligence-performance correlation was significantly *negative* (-.27, $N=51$, $p<.05$). There also was a

TABLE 1
Intercorrelation of Variables Used in Study
($N = 102$)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1. Intelligence	1.0															
2. Experience	-.13	1.0														
3. Task structure	-.28**	.12	1.0													
4. Routine paperwork	-.09	-.06	.10	1.0												
5. Project engineering	.07	-.15	.06	-.30***	1.0											
6. Supervising subordinate	-.10	.32***	.20*	-.03	-.17	1.0										
7. Evaluating field units	-.09	.07	.08	-.23**	.15	-.13	1.0									
8. Training field units	-.16	-.01	.00	-.27**	-.11	-.18*	.11	1.0								
9. Policy advising	.10	-.15	-.09	-.31***	-.12	-.19*	-.11	-.07	1.0							
10. Decision making	.01	.03	-.14	-.22*	-.14	-.20*	-.04	.02	.09	1.0						
11. Administrative support	.18*	.07	-.03	-.25**	-.07	-.14	.02	-.03	-.12	.02	1.0					
12. Public representative	.04	-.06	-.30***	-.07	-.19*	-.14	-.14	-.04	.02	.02	-.11	1.0				
13. Attending staff meetings	.24**	.11	-.22*	-.14	-.17	-.04	-.10	-.18*	.22*	.12	.02	.13	1.0			
14. Boss stress	.03	.02	-.02	.03	.22**	.05	-.18*	-.20*	.02	-.14	.02	.03	.05	1.0		
15. Job stress	-.15	.11	.20*	-.03	-.08	.21*	-.16	.12	-.01	-.15	.10	-.01	-.07	.15	1.0	
16. Performance	-.02	.18	.02	-.05	-.23*	.10	.06	.12	.07	.08	.11	.11	.19*	-.07	.09	1.0

*$p < .05$
**$p < .01$
***$p < .001$

significant difference between the two correlations of .16 and –.27 ($z=3.33$). Contrary to expectation, these findings suggest that a relatively stress-free relationship between the staff officer and the immediate superior does not significantly increase the staff member's ability to use intelligence; however, a stressful relationship may make high intelligence not only useful but actually disfunctional.

Job stress seemed to have very little effect on the use of intelligence. When the sample was split at the median, the correlations between job stress, intelligence and performance was –.04 ($N=45$, ns) for low job stress and .05 ($N=42$, ns) for the high job stress condition.

Hypothesis 2 stated that the experience of staff personnel will be uncorrelated with task performance under stress-free conditions but correlated with performance when boss stress is high. This hypothesis was supported. The correlation between experience and task performance was .03 under low stress, but .44 ($N=48$, $p<.01$) under conditions of high boss stress. These results indicate, therefore, that the experienced staff officer is better able to cope with a stressful relationship with the superior than is his less experienced counterpart, presumably because he can fall back on previously learned behavior patterns and knowledge. The correlations between experience and performance were .14 ($N=45$, ns) for the low job stress condition and .07 ($N=60$, ns) for the high job stress condition.

Hypothesis 3 predicted a higher correlation between intelligence and staff performance under low boss stress when the task is unstructured than when the task is structured. The results, shown on Table 2, support this hypothesis in an unexpected manner. As can be seen, a significant but negative correlation between task performance and intelligence occurred when the task was structured and boss stress was high. Thus, again, low boss stress did not benefit the staff member on either structured or unstructured tasks, but high stress with the superior made the more intelligent individual perform significantly worse than the less intelligent staff member.

TABLE 2

The Effect of Boss and Job Stress on the Utilization of Intelligence and Experience on the Performance of Structured and Unstructured Tasks

	IQ × Performance (Hyp. 3)				*Experience × Performance (Hyp. 4)*			
	Task Structure				*Task Structure*			
	High		*Low*		*High*		*Low*	
Stress with boss								
Low	.12	(28)	–.12	(22)	.17	(30)	–.19	(26)
High	–.41*	(25)	–.16	(18)	.41*	(28)	.35	(18)
Job stress								
Low	.33	(17)	.01	(16)	–.44	(18)	.32	(16)
High	–.04	(25)	–.49	(17)	.32	(31)	.21	(18)

*$p<.05$

The effects of job stress on the utilization of intelligence and experience differ somewhat from those obtained under conditions of low or high stress with the superior. Intelligence, again, played no significant role in determining performance when job stress was low. However, when job stress was rated high and the task was unstructured, the relatively more intelligent staff members performed somewhat less well ($p<.10$) than did those who were less intelligent, that is, high intelligence was detrimental to performance. This relationship may be understood by recalling that an unstructured task, by definition, does not provide guidance on how to proceed or how well the task is being done. The effect of job stress in an unstructured task, therefore, is somewhat similar to the stress due to the relationship with the boss. The individual is under pressure to perform at a higher level without knowing how to go about doing so.

Hypothesis 4 dealt with the corresponding correlations between experience and performance under high and low boss stress and on structured and unstructured tasks. The prediction was that experience would benefit performance to a greater degree on structured than on unstructured tasks. The results, also shown on Table 2, are in the predicted direction and significant for the relationship between experience and performance under high stress and the structured tasks, but not significant for unstructured tasks. The difference between these two correlation coefficients was not significant. The results support earlier findings that indicate that the simple, structured tasks are performed well under stress if they are overlearned (Berkum, 1964).

Hypothesis 5 predicted for the low boss stress condition that the staff member's intelligence would correlate with performance more highly on tasks that make high intellectual demands than on tasks that make relatively low intellectual demands.

As will be recalled, staff personnel indicated the amount of time they devoted to each of the 10 major staff functions in the Coast Guard headquarters in the course of their work. These staff functions were then rated on the basis of how much intellectual effort each of them involved. In order to test Hypotheses 5 and 6, the sample was split as near to the median as possible on the percentage of time the individuals devoted to the task. Only those subjects were used for the analysis who spent a relatively large proportion of their time on a particular staff function. (Data for those who gave little time to the particular function are, of course, not readily interpretable, because this information does not reveal the alternative functions on which they spent their time.)

Hypothesis 6 dealt with the same subsamples, predicting that the experienced individuals would perform better under high boss stress on intellectually undemanding tasks. Analyses were identical to those relevant to Hypothesis 5.

Table 3 presents the results. This table shows, first of all, that the correlations between intelligence and performance under low boss stress are generally low but positive; those under high stress conditions are generally

TABLE 3
Correlations of Performance and Intelligence and Performance and Experience Under Low and High Boss Stress

	IQ × Performance (Hyp. 5)				*Experience × Performance (Hyp. 6)*			
Intellectual Demand of Task	*Low Boss Stress*		*High Boss Stress*		*Low Boss Stress*		*High Boss Stress*	
High								
Policy advising	.27	(30)	-.46*	(22)	.06	(35)	.43*	(22)
Project engineering	.38	(20)	-.16	(21)	.30	(22)	.13	(22)
Evaluating field units	.20	(16)	-.36	(10)	-.07	(20)	.60*	(12)
Decision making	.11	(21)	-.47	(13)	.01	(23)	.47	(14)
Administrative support	.35	(25)	-.47*	(25)	.06	(31)	.40*	(26)
Mean	.26		-.39		.07		.41	
Low								
Attending staff meetings	.28	(23)	-.28	(24)	.06	(23)	.53**	(26)
Supervising subordinates	.07	(29)	.04	(18)	-.06	(31)	.41	(19)
Training field units	.11	(26)	-.17	(21)	-.09	(31)	.42*	(23)
Public representation	.04	(26)	-.36	(16)	-.09	(27)	.55*	(18)
Routine paperwork	-.01	(25)	-.25	(21)	-.28	(27)	.44*	(22)
Mean	.10		-.21		-.12		.47	
Rank order correlations with intellectual demand	.78*		-.35		.83*		-.13	

*$p < .05$
**$p < .01$

negative, with two of the correlations reaching statistical significance. The median correlation under low stress with boss was .07; that under high boss stress was -.25. As a group, these correlations are, of course, significantly different from each other.

In addition, however, the correlations for task functions that are intellectually more demanding were generally higher than those in the less demanding intellectual tasks. The correlations under high boss stress were more negative for intellectually more demanding than less demanding tasks. The statistical significance of these results was here tested by correlating the task's rank on intellectual demand, provided by Coast Guard officers for each of the task functions, with the ranked magnitude of the correlation coefficients in the four columns of Table 3. Thus can be determined the degree to which the correlations between intelligence and performance, and between experience and performance, are higher or lower for intellectually demanding than nondemanding tasks. A positive correlation indicates, of course, that the intellectually demanding tasks benefit from the staff member's intelligence or experience.

The results of this analysis fully support the hypothesis, as indicated by the correlation of .78 shown on the bottom of Table 3. Although a correlation of .83 between the magnitude of the experience-performance coefficients and the rank ordering of tasks on intellectual demand also was found, none of the correlations in that column were above .30, and the relationship therefore is not of great theoretical or practical importance.

TABLE 4
Correlations of Performance and Intelligence and Performance and Experience Under Low and High Job Stress

	IQ × Performance				*Experience × Performance*			
Intellectual Demand of Task	*Low Job Stress*		*High Job Stress*		*Low Job Stress*		*High Job Stress*	
High								
Policy advising	.06	(29)	–.24	(23)	–.06	(30)	.44*	(29)
Project engineering	.27	(22)	–.05	(19)	.15	(22)	.27	(22)
Evaluating field units	–.02	(16)	.24	(10)	–.05	(17)	.38	(15)
Decision making	.15	(25)	–.53*	(14)	.00	(32)	.31	(16)
Administrative support	–.01	(28)	–.19	(23)	.12	(25)	.30*	(32)
Mean	.09		–.17		.03		.35	
Low								
Attending staff meetings	.02	(21)	–.49*	(26)	.27	(22)	.21	(27)
Supervising subordinates	.15	(23)	–.01	(24)	.08	(23)	.10	(27)
Training field units	.03	(16)	–.12	(24)	–.26	(24)	.38*	(30)
Public representation	.09	(19)	–.04	(23)	.12	(24)	.13	(21)
Routine paperwork	–.03	(25)	–.16	(21)	–.06	(27)	.01	(22)
Mean	.05		–.18		.03		.20	
Rank order correlations with intellectual demand	.15		–.16		.12		.68*	

*$p<.05$

The correlations between performance and intelligence and performance and experience are shown in Table 4 for high and for low job stress. It is clear that job stress was considerably less important than boss stress in determining the utilization of intelligence and experience. Of the 40 correlations listed in Table 4, only 4 were significant, which is not much more than the number to be expected by chance. There does seem to be a tendency for experience to correlate with performance at a somewhat higher level under high job stress. That is, 8 of the 10 correlations between experience and performance were higher in the high than in the low job stress condition, but the differences between the pairs of correlations are small.

Although not originally hypothesized, an additional analysis seemed indicated to determine whether the less experienced staff officers would be more affected by a stressful relationship with their superiors than would highly experienced staff officers. This seemed likely for several reasons. First, tasks tend to become more structured with repetition and experience (Bons & Fiedler, 1976) and, second, the "old hand" is more secure in the organization and less vulnerable to actions by his superior. He may have powerful friends in the organization and protection from civil service and military regulations, as well as custom and tradition.

The sample therefore was divided into thirds on the basis of time in service. (The median time in service was 18 years.) Intelligence and performance then were correlated under low and high boss stress and job stress for each of the subgroups (Table 5). As can be seen, the effect of boss stress on the relationship of intelligence with performance was quite

TABLE 5
Correlation of Intelligence with Job Performance for Staff Members Who Report Either High or Low Boss or Job Stress and Who Have Either High, Middle, or Low Experience in Government Service[a]

	Low Experience (10 years or less)	*Middle Experience (10-20 years)*	*High Experience (20 or more years)*
Low boss stress	.73*	-.23	.24
	(13)	(21)	(16)
High boss stress	-.43	-.28	.24
	(16)	(14)	(14)
Low job stress	.18	.24	.57
	(13)	(14)	(6)
High job stress	-.11	-.33	-.09
	(8)	(16)	(18)

[a] *N*s indicated in parentheses.
*$p \leq .001$

marked in the group with no more than nine years of service. For these staff officers the correlations for low and for high stress were significantly different. There were, however, no notable effects for job stress or for the more experienced groups.

DISCUSSION

To the authors' knowledge, this is the first quantitative investigation to determine how organizational variables affect the performance of staff personnel. It is also the first study of this kind that deals with the effect that stress with the immediate superior has on the individual staff member's use of his abilities. This exploratory study is based on correlational analyses. Any causal inferences, therefore, have to be tentative at this time.

It was expected from previous studies (Fiedler & Meuwese, 1963; Csoka, 1975; Meuwese & Fiedler, cited in Fiedler, 1967) that stress would attenuate the correlation between intelligence and leadership performance and that this would be particularly likely for stress with the immediate superior on whom the staff officer is peculiarly dependent (Fiedler & Leister, 1977). The consistent negative relationships between intelligence and performance under high stress with the boss, however, were unexpected. Of equal interest were the consistent positive correlations between experience and performance under high stress conditions. It is obvious from these results that a stressful relationship with one's immediate superior has a marked effect on cognitive functions. This finding has now also been obtained in another study of individuals in staff positions (Fiedler, Potter, Zais, & Knowlton, 1979). In contrast, job stress played a relatively minor role in this respect. The extent to which these findings generalize to nonmilitary organizations and different tasks still needs to be established. The study raises several methodological questions as well as substantive issues that merit further discussion:

Validity of Performance Evaluations

Staff officers justify their existence by the support that they render the immediate superior. In many cases, the immediate superior therefore is the principal, if not the only, person who can make a judgment about the effectiveness of the staff support which he or she receives. The possible confounding effect between stress with boss and the performance rating by the boss, therefore, must be considered in somewhat greater detail.

One would expect that a stressful relationship with the superior should result in a lower performance rating, or that poor performance by the staff officer might cause the relationship with the boss to be stressful. This was not the case, as shown by the low correlation of -.07 between the performance rating and the stress with boss measure. The explanation for this low relationship might well lie in the previously reported findings that leaders do not tend to be aware of how they are perceived by their subordinates. Thus, Mitchell (1970) correlated leaders' self-descriptions of their considerate and structuring behaviors with corresponding descriptions of their subordinates and of observers. He found no substantial correlation among any of these descriptions. Also, Gochman (1975) found no relationship between a leader's intended behavior and subordinates' descriptions of his behavior, or actual behavior. Another possible explanation lies in the finding of this study that some people (e.g., those with experience) perform better under stress than do others.

Relationship of Intelligence and Performance

One can readily account for the finding that experience will benefit the individual who is under boss stress by enabling him to fall back on previously learned behaviors. However, the finding that high intelligence under these conditions *detracts* from effective staff performance is far from obvious. The somewhat cynical dictum that it sometimes pays to be dumb seems to be well supported by the findings. The work in large organizations is influenced to an increasing extent by the quality of staff work. Should it not be expected, then, that this work generally requires high intellectual abilities?

A closer look at the staff officer's job shows, however, that many tasks are highly routine. To the staff officer are frequently delegated the paperwork and the humdrum tasks in order to free the line manager for policy matters and unusual problems. The line manager, therefore, might well want in his staff a dependable but unimaginative aide who will follow, rather than initiate, policies. In fact, because the manager is held responsible for the actions of subordinate staff, an independent thinker, or someone who pursues new and daring approaches, may often be the last thing he or she wants. The line manager is more likely to reward someone who can patiently deal with organizational routines and the well-accepted policies. Someone who tends to deviate from standard operating procedures is likely to get the line manager into hot water. All this presents no problem as long as the line manager and the staff officer have high rapport and a stress-free relationship. Of course, if the relationship is stressful, it may well be because the staff officer has been thwarted in pursuing an intellectually adventurous course. Alternatively, as other studies, for example, Meuwese and Fiedler (Fiedler, 1967), indicate, stress and anxiety may be responsible for the misuse of intelligence. Specifically, staff officers may misuse their intelligence because they try harder under stress to develop new ideas or initiate new actions without being sufficiently self-critical.

From a practical point of view, the findings may have considerable implications for the utilization of staff personnel. Because highly intelligent and creative individuals are difficult to find, it is quite clear that the appropriate utilization of individuals with rare intellectual abilities or extensive experience is of utmost importance to the long term effectiveness of the organization that has acquired their services at considerable cost. The study suggests that the assignment of these individuals to superiors who place them under stress constitutes not only a disservice to the staff member, but a misuse of the individual's talents. The data imply, in fact, that certain organizations might do well to place the more intelligent officers in line positions where their talents will not go to waste.

Needless to say, the foregoing thoughts are highly speculative and require extensive further testing. However, one subsequent study, alluded to earlier, conducted on line and staff officers in nine army battalions (Zais, 1979) obtained highly similar results. The negative correlations between staff officer intelligence and performance should not, therefore, be passed off as mere chance findings. The study suggests that further research on the performance of staff officers in large organizations should be highly rewarding.

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Social Desirability Response Bias in Self-Report Choice Situations[1]

HUGH J. ARNOLD
University of Toronto, Canada
DANIEL C. FELDMAN
Northwestern University

The susceptibility to social desirability response bias of four alternative methods of measuring the importance of job and organizational characteristics is examined. Data were collected from 86 graduate management students. Results support the hypothesis that the explicitly stated subjective weight methodologies are more likely to evoke a social desirability response bias than is the inferred objective weight method.

The necessity of measuring the importance to individuals of characteristics of jobs and organizations arises in a wide variety of theoretical and applied situations in organizational behavior, for example, examining the validity of alternative models of motivation and studying the nature of the job choice process. Such importance measures are almost always obtained by asking subjects directly for their self-reports of the importance of characteristics on various types of rating scales. A problem with such self-report measures is their potential susceptibility to social desirability response bias, that is, a tendency for subjects to overestimate the importance to them of socially desirable job and organizational characteristics (e.g., challenge and responsibility) and to underestimate the importance of less socially desirable characteristics (e.g., pay).

Zedeck (1977) recently developed a new methodology for obtaining indirect measures of the importance of job and organizational characteristics. Briefly, this methodology involves asking subjects to rate their willingness to accept various work positions. The work positions are described to subjects in paragraphs containing statements operationalizing levels of the job and organizational variables under study. Each subject's responses are analyzed via multiple regression to derive within-subject importance weights for the variables under study.

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[1] The authors wish to thank J. Richard Hackman for valuable comments on an earlier paper and help in the formulation of this research project.

Zedeck (1977), and later Feldman and Arnold (1978), found discrepancies in results between the inferred objective weights derived from Zedeck's methodology and explicitly stated subjective weights obtained from traditional ranking and point-assignment methodologies. Both works attempt to explain these discrepancies in results among the self-report methodologies in terms of individual differences between subjects (e.g., growth need strength, amount of full-time work experience). However, as Feldman and Arnold (1978) suggest, there still remains the issue of which set of measurements—the inferred objective weights or the explicitly stated subjective weights—is the most valid in self-report studies of choice situations.

The hypothesis that the current research tests is that *social desirability response bias accounts for the discrepancies in results among self-report methodologies in choice situations.* As defined by Marlowe and Crowne, social desirability "refers to a need for social approval and acceptance and the belief that this can be attained by means of culturally acceptable and appropriate behaviors" (1964, p. 109). In a psychometric situation, social desirability would be inferred from a person's attribution of culturally approved statements to oneself and the denial of culturally unacceptable traits. It is argued here that the explicitly stated subjective weight methodologies are most likely to evoke a social desirability response bias, and that the inferred objective weights are not subject to such bias and hence provide the most valid measurement of importance weights in self-report studies of choice situations.

METHOD

Subjects

The subjects were 86 graduate management students who served voluntarily. The sample consisted of 41 females and 45 males.

Variables

In order to test the hypothesis, it is necessary to measure how job and organizational characteristics influence an individual's preference for—or willingness to accept—a position in an organization. In this study, measures of importance of a set of six job and organizational characteristics were obtained from the subjects. The three job characteristics and three organizational characteristics employed by Feldman and Arnold (1978) were employed here. The three job characteristics are: opportunities to use important skills and abilities; amount of autonomy and independence; and responsibility and leadership. The three organizational characteristics are: providing essential services and products to the public; salary and fringe benefits; and flexibility in scheduling hours worked and vacations. These characteristics were selected on the basis of being representative of the classes of variables that have been studied and found to exert an important influence on individuals' preferences for work positions (Betz, Weiss, Dawis, England, & Lofquist, 1966; Braunstein & Haines, 1968; Sheard, 1970; Tom, 1971; Vroom, 1966; Zedeck, 1977).

Measures

Four separate methods of measurement of the importance of the six characteristics were employed: (a) forced choice, (b) ranking, (c) point assignment, and (d) the Zedeck methodology. A brief description of how each of the measures was obtained follows:

(a) Forced-choice. Subjects were presented with the 15 pairs of the 6 variables. For each pair the subject indicated his/her preference between the two. The importance score for each variable was the number of times that variable was chosen by the subject (and could thus vary from 0 to 5).

(b) Ranking. Subjects were asked to rank-order the variables from most preferred to least preferred.

(c) Points. Subjects distributed 100 points among the six variables, giving the highest number of points to their most preferred variable and the lowest number of points to their least preferred variable.

(d) Zedeck methodology (inferred weights). In applying the Zedeck methodology, it is first necessary to construct a series of one paragraph descriptions of work positions. Within each paragraph there are six sentences, each one indicating whether a job or organizational characteristic is present or absent (e.g., "the organization provides essential services and products to the public" versus "the organization provides nonessential services and products to the public"). A factorial design was employed in which both levels (i.e., presence or absence) of all six variables were combined with one another, resulting in a 64 (2^6) item questionnaire. The order of the six variables within a work position description was held constant: type of services and products provided to the public, use of valued skills and abilities, job autonomy and independence, responsibility and leadership, pay and fringe benefits, and flexibility of working hours and vacations.

Second, it is necessary to obtain a measure of the subjects' willingness to accept each of the 64 position descriptions. Subjects indicated their willingness to accept each position by placing a vertical mark on a continuous response scale 150 millimeters long, anchored with "extremely unwilling" at one extreme and "extremely willing" at the other extreme. The midpoint of the scale was indicated with a slash. Responses were scored by measuring the distance in millimeters from the left extreme of the scale to the point indicated by the subject.

In addition to the four alternative measures of the importance of the job and organizational variables, the Marlowe-Crowne Social Desirability Scale (SDS) (Crowne & Marlowe, 1964) was used to measure the subjects' social desirability response bias. Marlowe-Crowne's SDS consists of 33 items representing behaviors that are culturally sanctioned and approved but are improbable of occurrence. One point is scored for each response in the socially desirable direction, with scores ranging from 0 (no social desirability) to 33 (highest social desirability). Scale norms drawn from 1,400 students in introductory psychology at Ohio State indicate a mean score of 15.1 for males and 16.8 for females (Robinson & Shaver, 1973). Crowne and Marlowe (1964) report both internal consistency and test-retest correlations of .88. In the present sample the reliability of the scale as measured by Cronbach's alpha was .81.

Analysis

In order to derive the inferred importance weights according to Zedeck's technique, the responses of each individual subject to the 64-item questionnaire were analyzed by multiple regression. The three job variables and three organizational variables served as independent variables. They were coded 1 or 0 according to whether the particular work position description indicated the presence or absence, respectively, of each of the six characteristics in the position described. The individual subject's ratings of willingness to accept each of the 64 positions described served as scores on the dependent variable. By regressing the subject's ratings of willingness to accept each position on the six job and organizational characteristics, regression weights and unique variance associated with each characteristic were determined for each individual subject. Because the factorial design employed insures orthogonality of the six independent variables, the squared multiple correlation increments associated with each variable are directly interpretable as unique variance associated with that variable. The orthogonality also insures that the beta weight for each variable is directly interpretable as an index of the importance of each characteristic to the individual subject being analyzed.

In addition, in order to facilitate comparison between the importance weights derived by regression and the subjects' self-reports of importance (the number of points out of 100 assigned to the variable by the subject), relative weights for each variable (Hoffman, 1960; Zedeck, 1977) were computed for each subject as follows:

$$RW_{yx} = \frac{B_{yx}r_{yx}}{R^2_{yx_k}}$$

where RW_{yx} equals the relative weight of variable x; B_{yx} equals the beta weight of variable x; r_{yx} equals the validity coefficient of variable x; and $R^2_{yx_k}$ equals the squared multiple correlation between subject responses and the set of six variables. The RW_{yx} provides a measure of the relative contribution of each of the six variables expressed as a proportion of the total predictable linear variance in responses. Because the relative weights sum to 1, it is possible to multiply relative weights by 100 and to compare these scores directly with the subjects' responses to the 100-point allocation self-report task.

RESULTS AND DISCUSSION

Results for each individual subject were first analyzed by regression. Means were then computed for the entire sample from these within-subject analyses.

Table 1 summarizes the mean importance of the six variables as determined by the four measurement methods. As can be seen from the table, the three direct self-report methods (ranking, forced-choice pairs, and self-reported points) all result in identical rankings of the importance of the six variables. However, the derived weights yielded by the indirect measure indicate a different ranking of the variables. More specifically, the three direct self-report methods all indicate that the three job factors (Variables B, C, and D) are most important, whereas the relative weights derived by regression indicate that Variable E (pay and fringe benefits) is in fact most important, followed by the three job variables.

TABLE 1
Comparison of Self-Reports of Importance and Relative Weights Derived by Regression

Variable	*Ranks*	*Pairs*	*Points*	*Weights*
A. Essential services	6	1.01(6)	9.05(6)	4.50(6)
B. Use skills and abilities	1	3.63(1)	23.19(1)	21.75(3)
C. Autonomy and independence	3	2.76(3)	17.88(3)	15.87(4)
D. Responsibility and leadership	2	3.23(2)	20.41(2)	23.03(2)
E. Pay and fringes	4	2.52(4)	17.09(4)	24.15(1)
F. Flexible hours	5	1.85(5)	12.27(5)	10.86(5)

TABLE 2
Intercorrelations Among Points, Pairs, Ranks and Weights[a]

	Points-Pairs	*Points-Ranks*	*Pairs-Ranks*	*Points-Weights*	*Pairs-Weights*	*Ranks-Weights*
A. Essential services	.77	.57	.77	.51	.60	.38
B. Use skills and abilities	.50	.68	.64	.30	.41	.37
C. Autonomy and independence	.68	.69	.62	.44	.52	.36
D. Responsibility and leadership	.75	.71	.82	.56	.56	.53
E. Pay and fringes	.75	.78	.75	.60	.58	.43
F. Flexible hours	.78	.67	.79	.63	.63	.46
Mean[b]	.71	.68	.73	.51	.55	.43

[a] Correlations with ranks are Kendall rank-order correlations. All others are Pearson product-moment correlations.

[b] Means were obtained by converting r's to z's, averaging the z's, and subsequently reconverting this average z to r.

TABLE 3

Comparison of Mean Differences Between High and Low Social Desirability Groups on Self-Reported Points, Forced-Choice Pairs, and Relative Weights

	Points				Pairs[b]				Weights			
	Social Desirability				Social Desirability				Social Desirability			
Variables	Low[a]	High[a]	Diff.	t	Low[a]	High[a]	Diff.	t	Low[a]	High[a]	Diff.	t
A. Essential services	7.82	9.41	-1.59	- .72	6.36	5.45	.91	.34	3.03	4.30	-1.27	- .38
B. Use skills and abilities	24.45	20.23	4.22	2.41*	24.24	23.94	.30	.13	23.88	15.71	8.17	1.58
C. Autonomy and independence	17.45	19.82	-2.37	-1.24	16.06	19.70	-3.64	-1.38	14.97	15.51	- .54	- .17
D. Responsibility and leadership	19.41	19.45	- .04	- .02	20.61	21.52	- .91	- .30	25.47	24.58	.89	.13
E. Pay and fringes	18.82	17.00	1.82	.62	19.09	14.85	4.24	1.31	18.71	25.89	-7.18	-1.18
F. Flexible hours	11.59	14.09	-2.50	-1.14	13.64	14.55	- .91	- .28	13.94	14.02	- .08	- .01

[a] $N=22$

[b] Pair scores were transformed from the 0 to 5 scale to a 0 to 100 scale to facilitate comparisons across methods.

*$p<.05$

Further support for the interpretation that the three direct self-report measures share a common response basis as opposed to the derived relative weights is contained in Table 2. Table 2 reports correlations between the importance measures obtained by the four methods. These data indicate that on average the three direct self-report methods are more highly correlated with one another than any one of them is with the derived weights.

In order to examine the effects of social desirability on subjects' responses, high and low social desirability groups were selected by taking the top and bottom quartiles of the sample on the Marlowe-Crowne Social Desirability Scale. Two sets of analyses were carried out. First, in order to rule out the hypothesis that social desirability may be an individual personality characteristic with a main effect influence upon the importance of job and organizational factors, the mean response of high and low Social Desirability subgroups were compared *within* each method of measurement. Results of these *t*-tests are reported in Table 3 and clearly indicate no within-method differences for the two subgroups (only one of 18 differences tested was significant).

The hypothesis that direct self-report measures are subject to social desirability as a response bias was tested by comparing the mean differences *between* self-reports and derived weights first for the low social desirability subgroup, and then separately for the high social desirability subgroup. ***It was hypothesized that significant differences between direct self-reports and derived weights would be found for the subgroup high on social desirability, but not for the low social desirability group.*** Results relevant to this hypothesis are summarized in Tables 4 and 5.

Table 4 compares the derived relative weights to direct self-reports based on the forced-choice pairs method. Results are in support of the hypothesis. For the low social desirability group there are no significant differences between the direct self-report measures and the derived relative

TABLE 4

Comparison of Differences Between Forced-Choice Pairs Scale and Relative Weights for Subgroups High and Low on Social Desirability

	Social Desirability							
	Low[a]				*High*[a]			
	Pairs[b]	*Weights*	*Diff.*	*t*	*Pairs*[b]	*Weights*	*Diff.*	*t*
A. Essential services	6.36	3.03	3.33	2.02	5.45	4.30	1.15	.53
B. Use skills and abilities	24.24	23.88	.36	.09	23.94	15.71	8.23	3.33***
C. Autonomy and independence	16.06	14.97	1.09	.54	19.70	15.51	4.19	1.90*
D. Responsibility and leadership	20.61	25.47	-4.86	-1.11	21.52	24.58	-3.06	-1.01
E. Pay and fringes	19.09	18.71	.38	.13	14.85	25.89	-11.04	-3.51***
F. Flexible hours	13.64	13.94	- .30	- .12	14.55	14.02	.53	.14

[a] $N=22$

[b] Pair scores were transformed from the 0 to 5 scale to a 0 to 100 scale to facilitate comparisons.

*$p<.10$

**$p<.05$

***$p<.01$

weights, but for the group high on social desirability two of the six differences are statistically significant ($p<.01$) and in the direction consistent with a social desirability bias. A third mean difference is marginally significant ($p<.10$) in the predicted direction.

Table 5 reports similar data comparing derived relative weights and self-reported points for each of the two subgroups. The findings are consistent with those reported in Table 4. For the high social desirability group, the differences between direct self-reported points and derived relative weights are significant ($p<.05$) for two of the six variables. For three additional variables (Variables B, C, and D), differences are in the direction consistent with a social desirability response bias, though the differences attain only marginal levels of significance ($p<.10$). For the low social desirability group, a significant difference is observed for only one factor (Variable A).

TABLE 5

Comparison of Differences Between Self-Reported Points and Relative Weights for Subgroups High and Low on Social Desirability

	Social Desirability							
	Low[a]				*High*[a]			
	Points	*Weights*	*Diff.*	*t*	*Points*	*Weights*	*Diff.*	*t*
A. Essential services	7.82	3.03	4.79	3.30***	9.41	4.30	5.11	2.08**
B. Use skills and abilities	24.45	23.88	.57	.14	20.23	15.71	4.52	1.86*
C. Autonomy and independence	17.45	14.97	2.48	1.37	19.82	15.51	4.31	1.99*
D. Responsibility and leadership	19.41	25.47	-6.06	-1.23	19.45	24.58	-5.13	-1.70*
E. Pay and fringes	18.82	18.71	.11	.04	17.00	25.89	-8.89	-2.61**
F. Flexible hours	11.59	13.94	-2.35	- .87	14.09	14.02	.07	.02

[a] $N=22$

*$p<.10$

**$p<.05$

***$p<.01$

Taken together, the results in Tables 4 and 5 indicate consistently that individuals who are high on social desirability have a tendency to overreport the importance of: (1) having opportunities to use important skills and abilities and (2) autonomy and independence. At the same time they tend to underreport the importance of pay and fringe benefits. These biases are not evident for persons low on social desirability.

Further research is obviously desirable to confirm the generality of these findings. Such research can be of considerable theoretical and practical value in further clarifying understanding of both (a) the importance of job and organizational characteristics to individuals and (b) the limitations and biases inherent in present measures of these factors. In particular, future research should move outside the laboratory to assess the bias inherent in the various methods of measurement as individuals are making choices among real alternative work positions. Such field studies, of course, would permit an assessment of the generalizability of the current findings. Moreover, such field studies would permit an assessment of relative bias in situations in which the job and organizational characteristics covary in nonorthogonal ways.

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Auditing an MRP System

JAMES F. COX
Auburn University
ROBERT W. ZMUD
Georgia State University
STEVEN J. CLARK
Warner Robins Air Logistics Command

Although material requirements planning (MRP) has become an increasingly popular approach to production scheduling and control, few systems are considered successful. This research presents a simplified conceptual model for information system implementation success, an auditing instrument to evaluate the effectiveness of an MRP system, and a case study illustrating the use of the instrument.

Because planning and control are critical activities, many manufacturing organizations have implemented, or are currently implementing, sophisticated material requirements planning (MRP) systems (Davis, 1975; Miller & Sprague, 1975). However, MRP implementations have not all been successful (Donovan & King, 1977; Hall & Vollmann, 1978; Keegan, 1977), and at least one source indicates the proportion of successful MRP systems is as low as 5 percent (Belt, 1979; Wight, 1974). The development and implementation costs of an MRP system for an average size firm may range from $200,000 to $500,000 (Monks, 1977), but many firms have invested several million dollars without deriving MRP's intended benefits of reduction in inventory investment, increased customer service, and increased production efficiency (Johnson, 1978).

A successful or effective MRP system is one whose intended benefits are realized. Effectiveness thus is dependent upon (a) design tradeoffs associated with data entry, storage, processing, and output, and with the linkages necessary for integrating MRP with other organizational information systems and (b) the extent to which the MRP outputs will be applied within a particular manufacturing environment. Both technical and behavioral issues are therefore involved.

Many individuals have expressed sentiments similar to these, but most often concern has been centered on a single problem area or on a few, related problem areas. Quigley (1980a, 1980b, 1980c, 1980d) provides three simple pre-MRP tests related to the bill of material and routing file accuracy, work in process inventory accuracy and inventory file accuracy to indicate whether a firm is ready to implement an MRP system. Additionally, in a survey of 13 manufacturing firms utilizing MRP systems, Wemmerlov (1979) describes several design factors including replanning frequency, lead times, safety stocks, rescheduling policies, and capacity planning and priority control. However, no evaluation of any factor or firm is provided. Both Smith (1978) and Woolsey (1979) list pitfalls to successful implementation of MRP systems. A comprehensive coverage of both technical and behavioral considerations has not appeared. Two recently published "checklists" that only address technical issues are exceptions (Garwood, 1977; Wight, 1977).

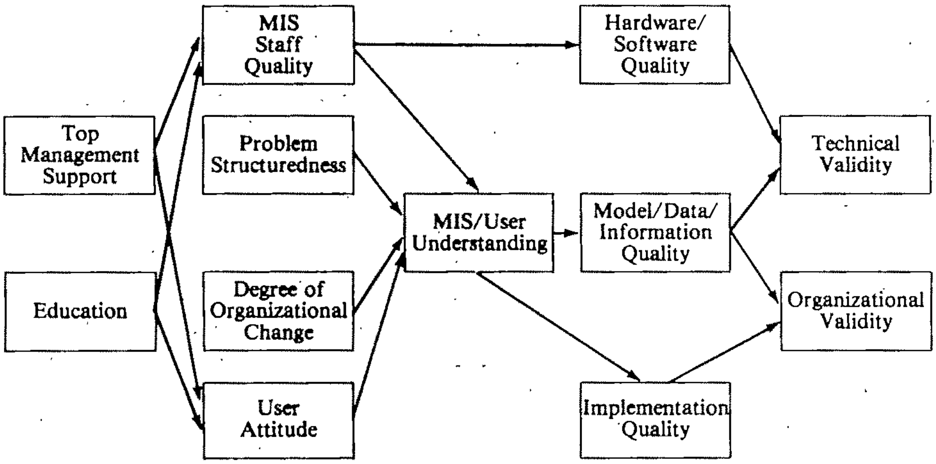
Because of the growth in number of firms implementing MRP systems, the high costs involved, and the low success rate of systems, the present research was undertaken. This paper provides comprehensive coverage of the technical and behavioral aspects of an effective MRP system. The purpose of this research is twofold: (1) to present an auditing instrument to assist managers in evaluating the effectiveness of an MRP system and (2) to present a case study illustrating the use of the auditing instrument in identifying technical and behavioral problems. The conceptual model to be presented may be related to any type of information system, but the auditing instrument to be presented is specifically tailored to identify and evaluate problems associated with most MRP systems.

The auditing instrument was administered within a manufacturing plant experiencing problems with a recently implemented MRP system. Thus this application contains a relatively small number of observations from a single firm, and the results should not be generalized to other firms. The intent of the application was not to prove or disprove anything statistically, but rather to illustrate usage of the instrument. Nevertheless, as the auditing instrument was designed to assist in the identification of problems associated with MRP systems in general, it should enable most manufacturing organizations to identify problems associated with a particular MRP system. The use of the behavioral section of the instrument may be limited, inasmuch as it may identify the symptoms of a problem and possibly not the problem itself. Also, as with most behavioral questionnaires, an individual's responses may not be indicative of that individual's behavior.

FACTORS INFLUENCING IMPLEMENTATION SUCCESS

Although not explicitly addressing the implementation issue, Ein-Dor and Segev (1978) provide a conceptual framework for reviewing the literature concerning strategic planning for management information systems. An examination of the implementation literature (Boland, 1978; Bostrom & Heinen, 1977; Carter, Gibson, & Rademacher, 1975; Churchman & Schainblatt, 1965; Edstrom, 1977; Ginzberg, 1978; Lucas, 1976; Schultz & Slevin, 1975) resulted in the conceptualization of implementation success portrayed in Figure 1. Adopting the approach of Schultz and Slevin

FIGURE 1
A Model for Implementation Success



(1975), success is viewed as a dual construct involving technical validity and organizational validity. Technical validity refers to the capability of the information system to function as required; its design results in useful and beneficial information outputs. Organizational validity refers to the compatibility of the information system with the emotional, political, and cultural realities of the organization.

Technical validity is shown to be related to (a) the quality of the hardware/software design, that is, data base, processing environment, inquiry languages, etc., and (b) the quality of the output information, the input data, and the models used in transforming data into information. While being dependent upon information, data, and model quality, organizational validity is also dependent upon the manner in which implementation transpires—conversion strategy, training sessions, particular roles assigned to users, attitude of MIS staff, etc.

Hardware/software quality is largely a function of the quality of the MIS staff, which in turn is reflective of top management's financial support and the direction of the MIS effort. Both the quality of information, data, and models and the quality of the implementation process are primarily a result of the interactions between the MIS staff and the users. Such interaction takes place when specifying system requirements, evaluating the alternative designs for meeting these requirements, and deciding on the methods employed in implementing the information system in a way to minimize organizational disruptions. The greater the mutual understanding (Churchman & Schainblatt, 1965) achieved between the MIS staff and the users, the greater is the likelihood that success will be achieved.

The degree of mutual understanding between the MIS staff and the users is viewed in two ways: (1) a problem perspective that influences the extent of mutual understanding required and (2) an organizational perspective that influences the likelihood that a required level of mutual understanding is attained. There are two problem characteristics: the structuredness of the problem, that is, whether or not it is well understood; and the degree of organizational change that results, that is, the impact of an information system on the duties and responsibilities of users and upon sociopolitical structures. The less structured the problem and the greater the expected organizational change, the higher the required level of MIS staff/users understanding. Two important organizational characteristics are (1) the quality of the MIS staff, that is, how well do they understand the organizational problem area and what type of interpersonal skills do they have and (2) the attitudes of users toward information systems. Both MIS staff quality and user attitudes can be enhanced through appropriate educational programs and top management advocacy (leadership plus the provision of a conducive environment for MIS staff/user interactions).

Manufacturing problems and the techniques associated with MRP systems are, to a large extent, fairly well understood (Orlicky, 1975). The degree of organizational change that is to be expected from an MRP implementation is quite significant, resulting in a requirement for a high degree of MIS staff/user understanding (Hall & Vollmann, 1978; Johnson, 1978; Wacker & Hills, 1977). MRP imposes a strict discipline on manufacturing personnel, which often comes as a severe shock after years of loose "seat of the pants" methods. It is virtually impossible to implement MRP without observing the following outcomes: informal systems are formalized; semi-independent functions are interrelated; job descriptions are created, eliminated, or changed; power and authority relations are changed; and performance becomes more visible.

In summary, a number of factors must be considered in evaluating the effectiveness of a computer based information system such as MRP. In order to ensure technical and organizational validity, the quality of the hardware/software design, the quality of information, data, and models, and the quality of implementation procedures must all be evaluated. In order to isolate the causes of quality deficiencies, factors such as top management support, education, MIS staff quality, user attitude, and MIS staff/user understanding must also be investigated. Any comprehensive evaluation instrument must therefore be comprised of items reflecting a wide variety of technical and behavioral considerations.

COMPANY BACKGROUND

In 1973 a study committee composed of both corporate and plant level managers was established to study the problems associated with production and inventory control. Corporate management believed control of raw materials and finished products was adequate, but that due to expanding sales and changes in product mix, control of work-in-process inventory was nonexistent. Corporate employees controlled raw material inventory levels based on historical usage and finished products through their computerized sales-order entry and finished goods inventory system, and plant employees maintained work-in-process levels manually. The study committee recommended the use of an MRP system in conjunction with present methods of controlling raw materials and finished products.

In 1975 the plant obtained a separate computer and an MRP software package that was modularly structured and designed for use in either batch or on-line mode. Because of differences in computer hardware, the two separate data bases—the raw materials/finished goods data base and the MRP data base—were unable to communicate with each other directly.

Implementation was completed in early 1977. The MRP system was maintaining an average of 80 percent correct priorities, a finished goods inventory turnover of 17 (this is primarily a make-to-order manufacturer that maintains a small in-plant-finished goods inventory), and an 86 percent service level, and had reduced work-in-process inventories by 30 percent. Management was initially satisfied with the system, but problems soon began to surface. For example, reports grew in volume, causing users to disregard their importance; work-in-process inventories increased; and service level decreased. Finally, in October 1977 corporate management requested a system audit.

METHOD

The auditing instrument consisted of two separate questionnaires. The first sought to evaluate performance and identify potential technical shortcomings of the current MRP implementation. The second examined the attitudes of management, users, and systems personnel involved in the design, implementation, and operation of the MRP system.

Technical Questionnaire

This questionnaire was completed by the plant employee(s) responsible for each of the related activities and consisted of over 80 questions. Specific items required either a short answer or a "yes/no" type response. To respond to several questions required a considerable amount of time and effort of the employee. The following technical areas were considered: technical design, master scheduling/capacity planning, information quality, inventory management, and rescheduling.

The technical design section investigated the existence of functional and supporting subsystems believed necessary to achieve an effective MRP system. Such subsystems include production scheduling, production control, shop floor control, inventory management, purchasing, information reporting, and integration of the MRP system with other organizational information systems (finance, accounting, marketing, etc.). Specifically, questions related to the use of a daily dispatch list to maintain priorities within the shop, the use of the MRP system to provide information for both production and purchase orders, the size of the time periods used in the MRP system, the control of work in process inventory, the loading of work centers by using a finite or infinite loading technique, and other functions.

Questions comprising the master scheduling/capacity planning section examined the formality of planning processes, the use of forecasts, the nature of customer demand, the planning horizon, the finished product lead time, and the frequency of master schedules. Also investigated were the use of a master schedule/capacity planning feedback technique, the queue length at critical work centers, and the technique used in determining order completion dates.

The third section of this instrument evaluated information quality by measuring the accuracy of MRP data files and the volume of output reports. Items related to file integrity concerned the accuracy of the inventory status files (both on-hand and on-order), the bill-of-material file, the routing file, and the engineering data file. Also, procedures for updating and verifying file content were investigated. The number and frequency of reports as well as estimates of report usage were used as indicators of the quality of the information.

Inventory management questions evaluated the effectiveness of policies concerning raw materials, work in process, and finished goods inventory levels, maintenance of a stable production rate, and customer service. Specific areas examined were raw materials controls, cycle counting, safety stock, lot sizing, tagging procedures, and the amounts of inventories. Additionally, other indicators related to inventory management were the percentage of finished products made to order (in terms of quantity and dollars), the lead time of make-to-order products, the average duration and quantity of stockouts, and validity of promised delivery dates, the percentage of finished goods safety stock, techniques used in reviewing the depletion of finished goods, and the frequency of customer complaints.

Finally, the rescheduling characteristics of the MRP system were investigated. The amount of time spent in rescheduling, the amount of expediting, the use of dispatching techniques, and the policies and procedures for rescheduling and prioritizing orders were specifically examined.

Attitude Questionnaire

This questionnaire was administered to the management, user, and data processing groups involved with the MRP system. The term management referred to those employees having a "macro" view of the system: those who use only secondary information derived from day-to-day "user" information. The user group consisted of those employees involved with the MRP system on a "micro" level: those who supply and receive day-to-day MRP information in performing their jobs. The systems group included the system analysts and programmers responsible for designing, implementing, operating, and maintaining the MRP system.

Responses to statements were given on a 6-point Likert scale with a score of 1 representing strong agreement and a 6 representing strong disagreement. The attitude instrument measured perceptual differences in each of the following five areas: system complexity, education, user involvement, communications, and user acceptance.

The system complexity portion of the questionnaire examined design complexity, amount of information provided, understanding of the system, adaptability of the system, adequacy of processing time requirements, and the difficulty in reporting and processing transactions on a timely basis.

The education section surveyed attitudes toward implementation, training and its value in identifying information needs, the ability to understand and make decisions based upon reports, the extent of knowledge gained through experience, and the extent of understanding of the interrelationships of activities within the system.

Next, the extent of user involvement was investigated. The degree of responsibility and satisfaction of users, the severity of hardships placed on user departments, and the adequacy of time and departmental representation and participation in the design phase were examined.

The communications section measured perceptions regarding conflict among groups, freedom to criticize, and the levels of formal education, computer experience, and organizational experience.

Last, the system acceptance section examined attitudes toward resistance to change within the organization, support of the system, changes in the organization's power structure, social structure and work methods, support by top management, and assistance provided by each user.

Procedure

The auditing instrument was administered in April 1978. The respondents completing the technical questionnaire included the individual(s) responsible for each specific technical aspect. The attitude questionnaire was administered to management, user, and system groups involved with the MRP system. The management group consisted of seven individuals: the corporate production control manager, the division manager, the division materials manager, and the plant production, industrial engineering, accounting, and manufacturing managers. The user group consisted of 12 individuals: the materials manager, the production planning manager, two planners, three production supervisors, and five line department managers. The system group consisted of one system analyst.

RESULTS

The auditing instrument revealed both technical and human problems, with weaknesses derived from "yes-no" type responses and short answers to particular questions for each of the respective technical areas.

Technical Results

Functional design deficiencies included:

1. The MRP system was not used in generating daily dispatch lists or purchase orders.
2. No formal shop-loading technique (finite or infinite) was used.
3. Time buckets varied in size over the time horizon.
4. No formal procedures existed for identifying and correcting sources of errors reported as exceptions.
5. The MRP system was not used to provide information for marketing, finance, or long range manpower planning.

The master scheduling and capacity planning areas then were analyzed. The average number of customer orders in a given master schedule was 400 with a 3-4 week manufacturing cycle. Master schedules were replanned monthly and only for one month in advance. Weaknesses identified were:

1. Neither a formal master scheduling technique nor a formal capacity planning technique was used to review the master schedule.
2. Changes were made to the master schedule without considering all viable alternatives.
3. Order completions were not uniformly distributed over the master scheduling period.

Regarding information quality, the MRP system currently produced 33 different reports with exception reports generated on a daily basis. The following weaknesses were identified:

1. Reports were not tailored to individual needs. Printed output was excessive. Though some information from all reports was needed, actual time requirements ranged from daily to yearly. Of the reports found useful, only 20-30 percent of the content was actually used.
2. No formal procedures existed for updating or verifying the bill of material records or production specification records when product modifications or methods changes were made.
3. Inventory records, although having an accuracy of 95 percent, were verified only on a monthly basis.

Inventory management practices were hampered severely by the use of the two separate data bases. Performance measures included a finished goods turnover rate of 24 times per year and an average number of work-in-process items to finished goods items of 5 to 3. The following weaknesses were identified:

1. Finished goods inventories were not controlled by a forecast.
2. The level of work-in-process inventory was excessive.
3. Although the MRP system generated raw materials requirements, reorder-point techniques were applied to the separate raw material inventory data base to generate actual purchase orders.
4. Little, if any, improvement had been observed in customer service measures.

Weaknesses in the rescheduling capabilities and operation of the MRP system were:

1. Excessive use of expediting to maintain priorities.
2. No daily routine to review and clear exceptions to the planned production schedule, and no formal rescheduling policy.
3. Excessive rescheduling.

With respect to the responses to the technical aspects of the MRP system and the conceptual model of implementation success, the technical validity of the system is minimal. Several deficiencies were noted in each of the design, master scheduling/capacity planning, information quality, inventory management, and rescheduling sections of the questionnaires. These results alone indicate that the system was not properly designed to be an effective system and that the information provided would be of little benefit in managing the material flow and production capabilities within the manufacturing plant. In the design phase, hardware incompatibility (two separate systems) and the vital need for formal procedures for updating and maintaining the data base files indicate that the system is incapable of providing timely and accurate information. The underutilization of the full capabilities of an MRP system (i.e., not using it to develop daily dispatch lists, purchase orders, or provide information for other functional areas) indicates a lack of technical understanding by the MIS design team. Additionally, the nonexistence of a feedback loop to check the master schedule's production capacity requirements against the capacity available is a serious shortcoming of the present system and produces overloaded and underloaded departmental workloads. The excessive amount of information produced by the system reflects a lack of user participation in the identification of information needs and report design phases. Finally, the excessive amount of order expediting and high levels of work-in-process inventories, and the lack of improvement in customer service levels, are production measures that indicate that the MRP system is not functioning properly.

Attitude Results

The attitude questionnaire was administered to three groups (management, users, and systems personnel) and consisted of statements to be rated on a 6-point Likert scale. The five subject areas covered included system complexity, system education, user involvement, communications, and acceptance of the system. Several differences of opinions and deviations from preferred responses existed in all five portions of the questionnaire.

The mean response and standard deviation for each statement relating to system complexity are given in Table 1. Results indicated the following attitudes:

1. None of the three groups believed the MRP system to be simple, easy to understand, easy to use, or flexible in design.
2. Users in particular tended to view MRP as being a complex concept, the system design as being too ambitious, the MRP system as being

TABLE 1
Results of Attitude Questionnaire on System Complexity

	Managers (N=7)		*Users (N=11)*		*Systems (N=1)*
Question	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*
1. MRP is a complex change from the previous manufacturing control system.	2.28	1.03	2.55	1.08	1
2. MRP is difficult to implement because of its complexity.	3.43	1.05	2.73	.75	1
3. MRP is complex due to the excessive information produced in the reported output.	3.57	.90	2.91	.90	6
4. This organization's MRP system is an ambitious design.	3.14	1.25	2.73	1.13	2
5. The MRP system is simple and easy to understand.	4.14	.63	3.82	1.20	5
6. The MRP system is more complex now than when implemented.	3.43	1.18	3.27	.96	5
7. The MRP system is easy to use.	4.71	1.03	3.91	1.00	3
8. The MRP system is flexible in its design.	3.57	1.05	3.73	1.21	3
9. The system's lengthy periods for processing information can be attributed to its complexity.	3.14	1.36	3.45	.78	6
10. It is difficult to report transactions of the manufacturing process on a timely enough basis to effectively control operations.	3.00	1.41	3.73	1.14	2
11. The MRP system was designed with clearly defined objectives.	2.29	.88	3.19	1.11	2
12. The initial MRP design was simplified to facilitate implementation.	4.14	.83	3.09	.66	2
13. The information that I need to perform my job is lost among excessive information.	3.29	.45	3.36	1.43	NA
14. A complex system has a better chance for becoming successful.	5.00	1.31	4.64	.77	1
15. Frequent reporting of exception messages is a disadvantageous necessity of an MRP system.	2.57	1.18	2.91	.69	6
16. I am capable of performing adequately when I don't fully understand the work of those providing my information and the work of those who use the information that I supply.	3.71	1.48	3.91	1.62	5

more complex than the previous control system, and excessive output information as a prime factor contributing to system complexity.

In the area of education presented in Table 2, several shortcomings were noted:

1. Users did not understand the MRP output reports or use them in making decisions.
2. All groups lacked a general understanding of MRP concepts, operating details, and individual responsibilities regarding the MRP system.
3. All groups lacked confidence in the MRP system.

TABLE 2
Results of Attitude Questionnaire on Education

Question	*Managers (N=7)*		*Users (N=11)*		*Systems (N=1)*
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*
1. The MRP system users make decisions based on the reported information.	2.47	.73	3.27	1.05	5
2. The system users understand MRP concepts and operating details.	3.29	1.16	3.54	.89	3
3. The MRP system designers understand the user's information needs.	2.86	.64	3.63	.98	2
4. The MRP system designers are able to identify their own information needs.	2.57	.73	3.09	.90	2
5. The MRP system users have confidence in the system's design.	3.43	1.05	4.09	.79	3
6. The MRP system designers possess computer expertise and creative ability.	2.86	.83	2.81	.83	3
7. I understand my duties of the MRP system but not those of other MRP users.	2.71	.70	3.82	1.11	6
8. Management does not understand the requirements of my MRP system duties.	3.57	1.40	2.91	1.24	2
9. Many of the reports of the MRP system are not used because they are not understood.	2.71	1.16	2.73	1.05	2
10. I have above average knowledge in computerized information systems.	4.14	1.46	3.55	1.07	1
11. The MRP system generates more information than can be used.	4.14	1.25	3.27	1.28	5
12. Most of my knowledge about our MRP system came from on the job experience rather than from formalized training sessions.	2.86	1.12	2.00	.60	3
13. The MRP system requires much more of my time than it does the other users.	4.00	1.69	3.73	.96	4

Responses to statements on user participation in the system design are presented in Table 3. Results indicated the following shortcomings:

1. Lack of user participation in system design (identifying needs, reporting transactions, and report design).
2. Little knowledge of MRP concepts or design options during the design phase.
3. No review or continual monitoring of the performance of the MRP system or of user needs.

Several differences of opinions existed related to organization communications as shown in Table 4. Shortcomings included the following:

1. Personal conflicts and differences in group values existed.
2. Lack of an understanding by data processing of manufacturing in general and particular user functions was indicated.

TABLE 3
Results of Attitude Questionnaire on User Involvement

	Managers (N=7)		*Users (N=11)*		*System (N=1*
Question	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*
1. I am satisfied with the MRP system because of my efforts in its design.	4.14	1.46	4.82	.83	1
2. The reports of the MRP system are in a form which facilitates their usage.	3.29	.45	3.91	1.00	3
3. Participation in MRP design placed many hardships on my department.	5.14	.64	3.18	1.19	5
4. The MRP users in my department do not work well with the MRP system design team.	4.29	1.03	3.00	1.13	5
5. The MRP users continually review the performance and report needs of the system.	4.00	.93	3.09	.89	5
6. The MRP users had several options to choose from during the design stage.	3.57	1.18	4.91	.66	4
7. The user's information needs have been completely identified.	3.43	1.40	4.09	1.16	3
8. The major user design input was format of the reported outputs.	3.57	1.05	3.27	1.21	4
9. Positive results can be attributed to my efforts in the system's design.	3.57	1.40	3.18	1.19	1
10. The bulk of the design effort was the responsibility of the information systems specialist.	3.00	1.41	3.45	.89	2
11. I had little knowledge of MRP theory when the system's design took place.	2.86	1.73	2.36	1.22	4
12. The users designed procedures for reporting MRP transactions.	3.43	1.05	4.45	.89	3
13. My department was adequately represented on the design team.	3.29	1.16	4.18	.71	2
14. Design of the MRP system required little of my time or effort.	3.14	1.72	2.64	1.15	6
15. The MRP system provides more information than I need to make decisions.	3.00	1.41	3.36	1.30	NA
16. Adequate time was allowed for the design of the MRP system.	3.29	1.16	3.82	.71	2

3. Users tended to feel that their ideas were not seriously evaluated an that they were not free to criticize the MRP system.

Responses related to system acceptance (Table 5) reflected the followin attitudes:

1. Lack of support of the MRP system by management.
2. Lack of confidence in, and support of, the system by users.

In comparing the responses of the different groups to the organization validity segment of the conceptual model, a lack of mutual understandin and agreement among the groups is evident. None of these groups thougl the MRP system easy to understand, easy to use, flexible, or simpler tha

TABLE 4
Results of Attitude Questionnaire on Communication

Question	*Managers (N=7)* *Mean*	*Managers (N=7)* *Standard Deviation*	*Users (N=11)* *Mean*	*Users (N=11)* *Standard Deviation*	*Systems (N=1)* *Mean*
1. The users are capable of communicating their information needs to the design team.	3.43	.90	3.09	.67	5
2. The design team understands the user's functions.	3.43	.79	3.55	.66	2
3. Data processing has a higher position in the organization than do the users.	4.00	1.41	3.45	1.23	4
4. Data processing lacks technical expertise of the manufacturing process.	2.86	1.25	3.18	1.03	4
5. There is a gap in the levels of formal education between users and data processing.	2.57	.90	2.55	1.23	5
6. The users direct their information needs to a systems analyst.	3.14	1.12	2.73	.62	2
7. The users direct their information needs to a group of systems programmers.	4.43	1.05	3.91	1.16	6
8. MRP system users have little computer experience.	2.29	.45	2.36	.77	2
9. The personnel on the design team have a low turnover rate.	2.71	1.16	3.55	1.08	2
10. Too many people were on the design team.	4.00	1.07	4.27	.74	2
11. The users on the design team had lengthy experience in the organization.	3.14	.99	3.00	1.35	NA
12. The users of the MRP system feel free to criticize the system's performance.	2.28	.88	3.27	1.21	2
13. There is a conflict between user values, management values, and data processing values.	2.57	.73	2.36	.77	2
14. The user's ideas are seriously evaluated as to their feasibility.	2.86	.64	3.27	.75	2
15. Personal conflict exists between the user, data processing, or management.	2.86	.35	2.73	1.21	5

the previous system. These criticisms reflect a lack of education of top management, system, and user personnel on MRP concepts prior to system design, a lack of user participation in the system design phase, and a need for more support and involvement by top management in the initial planning, design, and implementation efforts. The amount of organizational change required in designing and implementing an MRP system is significant, and the lack of continued involvement in establishing and defining the new relationships and responsibilities of users was a contributing factor to system problems.

TABLE 5
Results of Attitude Questionnaire on User Acceptance

	Managers (N=7)		*Users (N=11)*		*Systems (N=1)*
Question	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*
1. MRP changes the organization's power structure.	4.57	1.18	3.82	.72	3
2. MRP changes the social environment.	3.57	1.40	3.45	.89	5
3. MRP requires unlearning old and acquiring new work methods.	2.29	1.28	2.45	1.37	1
4. Top management supports MRP.	1.57	.72	3.55	1.16	3
5. MRP requires me to make decisions on a more formalized basis with little individual discretion.	2.86	1.12	3.09	.90	6
6. MRP aids others more than myself.	2.57	1.59	3.91	1.31	1
7. MRP is more useful than the informal system.	1.71	1.03	3.55	1.30	1
8. MRP will work in our organization.	1.71	1.03	2.36	.64	1
9. MRP requires new personal relationships that are uncomfortable.	3.86	1.46	2.91	.79	5
10. The goals of MRP aid me in the achievement of my personal goals.	2.86	1.36	3.55	.89	3
11. I need the information that MRP provides.	2.57	1.40	3.09	.90	NA
12. The computer was introduced to replace people.	5.86	.35	3.73	1.42	6
13. The informal system controls as well as the MRP system has thus far.	4.29	1.67	3.09	1.08	5
14. The MRP system enables me to perform my job better.	3.00	1.77	3.45	1.16	NA
15. The MRP system has produced stress between certain areas of the organization.	2.57	.90	2.36	.98	1

DISCUSSION

The major technical problems identified were related to an overall lack of planning. For example, policies and procedures necessary to tie actual manufacturing activities to the MRP system had not been developed or were not utilized. Purchased software packages are not stand-alone systems: modifications and enhancements typically must be undertaken by the individual manufacturing firm to meet its specialized needs. In this instance, no attempt was made to personalize the package system so that it was compatible with existing organizational systems. Additionally, capacity and priority planning and control problems existed. The master schedule must be evaluated with respect to available capacity at all work centers and schedule changes undertaken where capacity is unavailable. Input/output control reports are then used to compare actual performance to planned performance. Priority planning and control is accomplished through the use of a daily dispatch list. Without implementation of these technical considerations, an MRP system cannot function effectively.

Serious personnel problems also were identified. Users lacked knowledge of general MRP concepts, this particular MRP package, and specific design alternatives, and systems personnel lacked knowledge of user functions. It appears that a lack of planning and commitment by top management to provide education to critical employees in the early stages of system design was a major obstacle to success, and this resulted in a reluctance to criticize, a general distrust of, and a lack of confidence in the MRP system.

The results of the case study indicate that several basic behavioral considerations were violated. To increase the chances of success in implementing any MRP or information system, top management, users, and systems personnel must be educated in the proper application of the proposed techniques; users must be actively involved in the design, implementation, and operation of the system; and top management must actively support the project. The violation of these behavioral considerations is not unique to this case study. Both the management information system literature (Lucas, 1978) and the management science literature (Naylor & Schauland, 1976; Schultz & Slevin, 1975) provide examples of failures caused by the violation of these basic considerations. In a survey of preparers and users of forecasts conducted by Wheelwright and Clarke (1976) many forecasting problems identified were organizational and included a lack of effective communications between the two groups, a lack of user understanding or education related to forecasting techniques, a lack of forecaster understanding of the business functions, poor implementation of forecasting programs and ill-defined criteria and objectives for forecasting. In a study of the relationship between organizational and technological change in five major corporations, Moan (1973) reports finding that effective organizational change is related to top management's knowledge and understanding of the technological innovation. That is, the higher top management's level of technical competence, the more likely organizational change will take place with respect to an organization's method of operation. In addition, researchers have identified one or more of these behavioral considerations as being instrumental in the success of MRP systems (Maertz, 1979), information systems (Edelstein & Melnyk, 1977), and management science projects (Chen & McCallum, 1977; Hudson, Chambers, & Johnston, 1977; Shycon, 1978).

In view of both the technical and organizational validity constructs of the conceptual model (measured via the auditing instrument), the MRP system under consideration exhibited a number of serious problems. The existence and severity of these problems were, in fact, supported by management's independent action to discontinue temporarily the use of the MRP system in August of 1978 until corrective measures could be implemented.

CONCLUSION

From the above discussion, it should be clear that numerous factors can lead to the unsuccessful design, implementation, and operation of an

MRP system. Both time and effort by management, users, and system groups are requisites to deriving the maximum benefits of such a system. Technical design deficiencies, operation problems, or human problems may inhibit success. By using a comprehensive auditing instrument similar to that described above, an organization's ability to identify and address symptoms before they become problems is increased.

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Research Notes

ORGANIZATIONAL OBJECTIVES AND WINNING: AN EXAMINATION OF THE NFL

DONALD R. LATHAM
University of Mississippi
DAVID W. STEWART
Vanderbilt University

Even when not explicitly defined, managements have objectives that must impact on both the structure and the productivity of the organization. Drucker (1974a) has observed that few managements have a clear idea of their objectives, and he believes this to be one of their worst mistakes. It is easy to become engaged in the day-to-day management of an enterprise and lose sight of primary, long range objectives. Among the most frequently cited organizational objectives are those related to marketing, innovation, human organization, financial resources, physical resources, productivity, social responsibility, and profit requirements (Drucker, 1974b). The specific objectives of each of these areas of organizational performance vary from organization to organization and from organization type to organization type. An examination of organizational objectives within a particular type of organization and subsequent comparisons of objectives across organizational types may prove useful in determining how organization objectives are developed and transformed and how these objectives influence the structure of the organization. The present study sought to examine the managerial objectives in a particular type of organization, professional sports franchises. More specifically, the study focused on the National Football League (NFL).

Organizational objectives usually are objective or subjective statements of organizational intent. Their purpose is the definition of some desired end-state the organization wishes to achieve. A measure of effectiveness, based on common usage of the term, would be how well the organization meets the end-state(s) (Evan, 1976). Given that all organizational objectives are not simple, short range, and quantifiable, there may be a hierarchy of objectives that could better define the intent of the organization (Seashore & Yuchtman, 1967). Seashore and Yuchtman (1967) suggested a hierarchical model that included some ultimate criterion, a set of penultimate criteria, and a subsidiary level of variables.

The generally accepted success criteria for National Football League teams is the win/loss record. Because the reasons for "acquiring" National Football League teams vary considerably (Noll, 1974), the win/loss record may be the ultimate criteria. And because organizations embrace a multi-goal function to determine effectiveness (Kirchhoff, 1977), other goals/objectives must be identified. Hall (1977) suggested goal statements that should derive the highest level of managerial commitment. This implies that the stated goals/objectives of organizations may be situation/organization specific. Kirchhoff warned against "'explaining the world' from a self-determined foundation" (1977, p. 352).

Bilky (1973) addressed the issue of actual versus stated objectives in his comprehensive study of goals/objectives. Using his logic, one may conclude that even the win/loss record of teams is inadequate to explain why teams "behave" as they do. Bilky (1973) also suggested that there was little discrepancy between stated versus actual goals. If this is true, there is merit in analyzing tradeoffs between objectives as they relate to some ultimate criteria. Penultimate criteria such as stadium size, attendance, profitability, and quality of players intuitively play some role in the teams' creation of their objectives. However, low response rates to questions concerning such criteria yielded less representative results than did the win/loss records of the teams. Therefore, examination of the ultimate criteria, win/loss records, seemed more substantive.

Dent (1959) suggested following a path paved by the early chemists. This would involve studying the various sports organizations as separate entities. Ultimately, this could result in the ability to generalize from this base-line study.

A pilot study conducted by Boghossian, Dawkins, Cochran, Latham, Corrigan, and Waters (1976) indicated that the performance of a team was related both to its objectives and to its organizational structure. This initial study involved the public relations representatives of four NFL teams and served as a basis for generating a list of organizational objectives relevant to an NFL franchise team. *It was hypothesized* on the basis of the pilot study *that the relative importance attached to these objectives would differ from consistently winning teams to consistently losing teams.* The present study sought to test that hypothesis.

Method

All 28 NFL teams were contacted and asked to participate in the research project. Of these teams, 10 agreed to participate, 12 refused to participate, and 6 teams failed to respond to either the initial inquiry or a follow-up contact. On-site interviews were conducted with representatives of the participating teams. Several representatives of each team completed a modified Likert scale designed to ascertain the importance they felt their organization placed on various objectives. The 40 team representatives included general managers, public relations officers, directors of finance, directors of ticket sales, and directors of player personnel. The participating franchises included the Cleveland Browns, Dallas Cowboys, Kansas City Chiefs, Miami Dolphins, Minnesota Vikings, New England Patriots, New

Orleans Saints, San Diego Chargers, Seattle Seahawks, and Tampa Bay Buccaneers. Based on a 3-year win/loss record, the teams were classified as winning, moderate, and losing teams. Teams winning at least 66 percent of all games in the 1974 to 1976 seasons were classified as winning; teams not winning at least 33 percent of all games during this same period were classified as losing. Moderate teams were those winning at least 33 percent of their games but less than 66 percent. This categorization resulted in two of the participating teams being classified as winning teams, four being classified as moderate teams, and four as losing teams.

Analysis

A series of discriminant analyses was undertaken to determine which of the 20 objectives discriminated winning, moderate, and losing teams. No a priori hypotheses about the relative importance of the objectives seemed justified in an exploratory study. Therefore, an initial direct discriminant analysis was undertaken, that is, all 20 objectives were used simultaneously to discriminate among the teams. This first analysis resulted in a perfect classification of cases even when a jackknife procedure (Dixon, 1970) was employed. It was clear, however, that not all objectives contributed equally to the two significant discriminant functions obtained. A second analysis, involving a forward stepwise procedure, was employed using Wilks Criterion. The findings of this second analysis also resulted in 2 significant discriminant functions, but involved only 14 of the original 20 variables. With the exception of the objective, winning-defensive strategy, the variables eliminated did not appear to be highly correlated with win/loss records, nor did they appear to be contributing much to the discrimination among cases. "Winning-defensive strategy" was eliminated by the procedure because of its high correlation with "winning-offensive strategy." The latter variable is probably better interpreted as a "winning" objective.

This second analysis resulted in classification functions that misclassified only two cases: a winning team was classified as moderate and a losing team was classified as moderate. No confusion between winning and losing teams was obtained using a jackknife procedure. The two discriminant functions were both significant at the .01 level. Wilks lambda obtained a final value of .11.

To explore more fully the nature of the discriminant functions, the function structure matrix was derived and submitted to a VARIMAX rotation.

Results

An analysis of the penultimate criteria produced no significant results. No significant differences were found among winning, moderate, and losing teams when the win/loss record was compared to such variables as stadium size, attendance, increase or decrease in profits, or influence of key organizational executives. However, significant differences among winning, moderate, and losing teams were discovered when the objectives section of the questionnaire was analyzed.

Table 1 provides a breakdown of the means and standard deviations of each of the objectives by class of team. It is clear from this table that the team representatives place considerable emphasis on many of the objectives. Further, it is apparent that the relative agreement on the importance of the objectives varied from objective to objective.

Table 2 gives the discriminant function structure matrix. In general, the correlation between any one objective and a discriminant function is small. This is not surprising in the light of the diversity of objectives that make up each discriminant function and the restricted range of scores used by the respondents in rating the objectives. Table 3 provides the average team discriminant function scores.

A tentative interpretation of the functions based on the structure matrix and the group centroids suggests that the first discriminant function is bipolar, with entertainment objectives at the positive pole and survival objectives at the negative pole. The second function also appears to be bipolar, with objectives related to winning at the positive pole and NFL needs at the negative end.

Winning teams tend to be at the negative end of both discriminant functions, suggesting that they place more emphasis on survival than do moderate and losing teams. Moderate teams appear to place more emphasis on winning than do either winning or losing teams.

TABLE 1

Means and Standard Deviations of Organizational Objective Importance Ratings

	Winning Teams		*Moderate Teams*		*Losing Teams*	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
Produce a team to satisfy the entertainment needs of the fans.	4.14	1.46	4.67	.69	4.67	.62
Produce a winning team (offensive strategy).	4.57	.53	4.83	.38	4.47	1.13
Improve the image of professional football.	4.29	.95	4.06	1.16	3.93	1.22
Improve the image of your team.	4.57	.53	4.44	.98	4.67	.62
Make the playoffs.	4.86	.76	4.89	1.34	4.67	1.39
Maintain survival in present location.	4.71	1.29	3.44	1.34	4.07	1.21
Obtain a share of the entertainment market.	3.00	.90	4.17	.61	4.20	.83
Satisfy some of the needs of customers (time, place, price).	4.14	.53	4.39	1.03	4.40	.99
Satisfy some of the needs of athletes (pay, benefits, work conditions).	4.43	.90	4.00	.61	4.13	.83
Satisfy some of the needs of employees (pay, benefits, work conditions).	4.00	.82	4.11	.90	4.13	1.19
Satisfy some of the needs of suppliers (purchasing considerations).	2.57	.53	3.56	1.29	3.20	1.26
Satisfy some of the needs of government (taxes, judicial).	3.29	.95	3.61	1.38	3.07	1.44
Satisfy some of the needs of community (economic, social, aesthetic).	4.29	.76	4.17	.92	4.27	1.16
Satisfy some of the needs of National Football League.	3.29	1.38	3.94	1.35	4.20	1.08

TABLE 2
Rotated Discriminant Function Structure[a] (Varimax Solution)

	Discriminant Function No. 1	*Discriminant Function No. 2*
Produce a team to satisfy the entertainment needs of the fans.	.29	–.04
Produce a winning team (offensive strategy).	.08	.27
Improve the image of professional football.	–.11	.08
Improve the image of your team.	–.03	–.16
Make the playoffs.	–.04	–.26
Maintain survival in present location.	–.36	–.22
Obtain a share of the entertainment market.	.41	–.07
Satisfy some of the needs of customers (time, place, price).	.16	–.03
Satisfy some of the needs of athletes (pay, benefits, work conditions).	–.19	–.06
Satisfy some of the needs of employees (pay, benefits, work conditions).	.06	–.02
Satisfy some of the needs of suppliers (purchasing considerations).	.33	.12
Satisfy some of the needs of government (taxes, judicial).	.05	.23
Satisfy some of the needs of community (economic, social, aesthetic).	–.04	–.05
Satisfy some of the needs of National Football League.	.27	–.16

[a] Correlation between discriminant functions and individual variables.

TABLE 3
Average Team
Discriminant Function Scores

	Score	
	Discriminant Function No. 1	*Discriminant Function No. 2*
Winning Teams	–1.62	–.73
Dallas Cowboys ($N=3$)[a]	–1.49	–.25
Minnesota Vikings ($N=4$)	–1.72	–1.08
Moderate Teams	.70	–.55
Cleveland Browns ($N=5$)	.97	–.58
Kansas City Chiefs ($N=5$)	.65	.18
Miami Dolphins ($N=5$)	.68	–1.06
New England Patriots ($N=3$)	.37	–.86
Losing Teams	–.09	1.00
Seattle Seahawks ($N=4$)	–.18	1.14
San Diego Chargers ($N=3$)	–.24	.94
New Orleans Saints ($N=4$)	–.14	.65
Tampa Bay Buccaneers ($N=4$)	.17	1.25

[a] N= number of participants within each organization.

Discussion

The present study is at best exploratory and its conclusions tentative. Sports franchises have been the topic of relatively little empirical investigation. This lack of research is at least partly a function of the teams themselves. Suspicion of academic researchers, concerns over the release of trade secrets and a subsequent loss of a competitive edge, and fear of unfavorable publicity all contribute to an unwillingness on the part of an organization to cooperate in a study of its objectives and structure. These problems are not unique to this study. For example, the financial data reported in the Noll (1974) text was based on responses from two teams. Sample limitations are acknowledged in this study also. For example, the New England Patriots were the only northeastern team to participate. However, limitations such as this are common in the literature. That 35.7 percent of the organizations in the NFL agreed to cooperate in the present study is significant, and the data so generated are of considerable import.

A team's success on the playing field is reflected in the organizational objectives of the team's management. Whether the objectives lead to success or success leads to the objectives is not clear. Also of interest is the finding that winning teams seem to place somewhat less emphasis on entertainment and winning objectives relative to moderate and losing teams, but place more emphasis on certain other objectives, for example, survival. It may be that successful teams in terms of their win/loss record have adopted a more balanced multi-objective position for their organizations. Less successful teams may not have that luxury but must respond to the more immediate pressures of bringing fans to the stadium. If this is accurate, in the functional evolution of a National Football League team, relatively more emphasis may eventually be placed on the noncoaching staff of the National Football League teams. Or, more succinctly, NFL teams may evolve to the stage at which the production emphasis (win/loss record) becomes relatively less important to (for example) survival in present location.

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ARE U.S. ORGANIZATIONAL CONCEPTS AND MEASURES TRANSFERABLE TO ANOTHER CULTURE? AN EMPIRICAL INVESTIGATION[1]

UMA SEKARAN
Southern Illinois University, Carbondale

Empirical cross-cultural research has been on the increase in the past few years. Transcultural research has, among other things, looked at similarities and differences in the attitudinal and behavioral responses of organizational members in different cultures. With the increasing number of multinational corporations, such research is important for builders and operators of these companies (Roberts, 1973).

A major concern in cross-cultural studies is that concepts and measures developed for organizational research in the United States may be culture bound. For this, and other methodological reasons, pessimism prevails about the significance of such studies for practical and theoretical advances (Roberts, 1970, 1973).

The tenet of this paper is that intracultural studies have many of the same issues and problems that cross-cultural studies do. If one does not despair about developing a well integrated body of knowledge within the United States, there should not be too much pessimism about integrating cross-cultural knowledge. Of course, the task is more complex, transculturally.

This study illustrates a multivariate cross-cultural approach to exploring the meaning of two attitudinal concepts—job involvement and job satisfaction—and their correlates across two cultures (the United States and India). Job involvement (JI) and job satisfaction (JS) are two variables identified as important to the quality of worklife for employees in the United States (Davis & Cherns, 1975; Taylor, 1973). They also are quite likely to be relevant indices of the quality of worklife for young, highly educated employees working in Indian organizations that take care of their employees' existence needs. For instance, banks in India recruit, even for their clerical staff, only those who have had a "first class," or at least a high second class, college degree. For these white collar workers with degrees in Economics and Statistics, there is no reason to disbelieve that the quality of life at work is not as important as for those in similar positions in the United States. That India is concerned about the quality of working life is evidenced by the fact that the Quality of Work Life Institute has been established in New Delhi, India, under the directorship of Professor Nitish De, since 1976.

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[1] Portions of this paper were presented at the Fortieth Annual Meeting of the Academy of Management, Detroit, 1980.

The present study examined the concepts of JI and JS using a sample of bank employees in the United States and India. The two questions investigated were:

1. To what extent are the measures of JI and JS developed in the U.S. culture appropriate for the Indian culture?
2. What, if any, are the similarities and differences among the predictors for JI and JS in the two cultures?

The predictors (20 in number) listed in the methods section, representing several demographic, personality, job and organizational climate factors, were chosen for this study based on a careful review of past research studies on JI and JS. Due to space limitations, a review of the studies is not undertaken. A point to note is that growth need strength, which has been investigated in both the JI and JS areas by other researchers, has not been included in this study. This is because previous research in the banking industry by this researcher did not identify growth need as a significant variable for bank employees. Instead, the need manifest variables (Steers & Braunstein, 1976) were used in this study. Also, tolerance for ambiguity, a variable found useful in predicting another job attitude—sense of competence (Lorsch & Morse, 1974)—was included to see what, if any, effects it had on JI and JS.

An answer to the two research questions raised above, using the 20 predictors, would shed light on the purposefulness and utility of cross-cultural studies.

Method

From U.S. banks 267 white collar workers and from Indian banks 307 such workers were randomly selected from 12 banks in the midwestern part of the United States and 9 banks in the central and southern parts of India. In both cultures, identical questionnaires were administered (with only the currency denomination changed for assessing income) by the same researcher. They were completed by groups of 20 to 30 employees on company time, in the banks' conference rooms, during late 1978 and early 1979.

The mean age of the respondents was almost the same in both cultures (35 in the United States and 37 in India). Of the U.S. respondents, 21 percent had college degrees, compared to 91 percent in India. This is mainly due to the Indian banks' policy of generally recruiting graduates only. Of the U.S. respondents, 83 percent were females as compared to 18 percent women respondents in India. This again is due to the small proportions of Indian women working outside of the home. See the *Statistical Outline of India*, 1977. Although there are some similarities and differences in the demographic composition of the workforce, all were white collar workers in the banking industry sharing the same mediating technology and operating under a common policy umbrella established by their respective central banks.

The criterion variable of job involvement was tapped by the most frequently used Lodahl and Kejner (1965) 6-item short measure. Job satisfaction was measured by the job descriptive index (JDI) (Smith, Kendall, & Hulin, 1969). The single item "faces" scale developed by Kunin (1955) was also included.

The 20 predictors used in this study were:

A. Demographic characteristics: age, education, sex, tenure and income;
B. Personality characteristics: N achievement, N affiliation, N dominance, N autonomy, Protestant ethic, locus of control, and tolerance for ambiguity;
C. Job characteristics: variety, autonomy, identity, and feedback;
D. Organizational climate factors: participation in decision making, communication, stress, and self-esteem from the work setting.

The demographic variables were tapped through single items in the questionnaire. The measures used for the other variables, their source references, and Cronbach's alpha for each in the two cultures are provided in Table 1.

In view of the low Cronbach alphas for the need manifest scale, the locus of control and the tolerance for ambiguity scales, in both cultures, these variables were dropped from further consideration. Thus, all the

TABLE 1
Details of Measures Used in the Study

Variables	*Number of Items*	*Origin of the Measure*	*Cronbach's Alpha*	
			U.S. Data	*India Data*
Personality factors				
Need for achievement	5	Steers & Braunstein, 1976	.45	.36
Need for affiliation	5		.10	.09
Need for autonomy	5		.36	.36
Need for dominance	5		.73	.46
Protestant work ethic	19	Mirels & Garrett, 1971	.76	.76
Locus of control	15	Duffy, Downey & Shiflett, 1977	.55	.40
Tolerance for ambiguity	7	Lorsch & Morse, 1974	.53	.38
Job factors				
Job variety	5	Sims, Szilagyi & Keller, 1976	.80	.63
Job autonomy	5		.79	.68
Job identity	4		.75	.65
Job feedback	3		.69	.55
Climate factors				
Participation in decision-making	5	White & Ruh, 1973	.88	.79
Communication	5	Price, 1972	.85	.78
Stress	9	Lyons, 1971	.81	.70
Self-esteem from job setting	4	Quinn & Shepard, 1974	.74	.84
Criterion variables				
A. Job involvement	6	Lodahl & Kejner, 1965 Six-Item Short Measure	.71	.76
B. Job satisfaction—				
JDI Scale	73	Smith, Kendall & Hulin, 1969	.77	.77
Faces scale	1	Kunin, 1955		

data analysis included only 14 predictors—the 5 demographic variables, the personality variable of Protestant ethic, the 4 job factors, and the 4 organizational climate factors.

Data Analysis

The data were analyzed individually for the U.S. and the Indian samples using three different statistical techniques. First, factor analysis was done on the 12 JI and JS items to examine how the bank employees in the two cultures perceived the two factors. Next, a stepwise regression analysis with a .0035 level of significance for entry and retention of the predictors in the regression model was done for each of the two criterion variables in the two cultures. This controlled for the Type I error due to the multiplicity of predictors (Pohlman, 1979; Pope & Webster, 1972). Third, tests were conducted to see if the beta weights of the predictors for each of the criterion variables in the two cultures were significantly different from each other, using the SAS test statements.

Results

Factor Analysis of JI and JS Items—Table 2 presents the results of a Varimax rotated two factor solution and the estimated communalities of

TABLE 2
Results of a Varimax Rotated Two Factor Solution of 12 Items Measuring Job Involvement and Job Satisfaction in the U.S. and India

	U.S. Data			*India Data*		
	Factor		*Estimated Communality*	*Factor*		*Estimated Communality*
Item	*1*	*2*		*1*	*2*	
Satisfaction with work	.73	−.19	.49	.64	−.33	.41
Satisfaction with supervision	.65	−.05	.39	.66	−.05	.35
Satisfaction with promotion	.62	−.13	.39	.61	−.11	.32
Satisfaction with pay	.62	−.10	.38	.56	.14	.27
Satisfaction with coworkers	.52	−.02	.25	.69	−.04	.40
Faces scale	.47	−.21	.25	.32	−.12	.12
The major satisfaction in my life comes from my job	−.13	.86	.61	−.07	.78	.54
The most important things that happen to me involve my job	−.10	.78	.57	−.01	.69	.46
I live, eat and breathe my job	−.02	.69	.41	−.08	.76	.47
I am very much personally involved in my work	−.21	.45	.28	−.06	.61	.35
Most things in life are more important than work	.17	−.25	.11	.11	−.31	.12
I am really a perfectionist about my work	−.02	.22	.09	−.04	.39	.20

Coefficient of Congruence for Job Involvement = .98.
Coefficient of Congruence for Job Satisfaction = .99.

the 12 items comprising the 6-item short measure of Lodahl and Kejner (1965) for JI, and the JDI scales of satisfaction with work, supervision, coworkers, pay, and promotion and the Faces scale. The two factors accounted for 46.7 and 47.5 percent of the variance in the U.S. and Indian samples, respectively.

As can be seen, two distinct factors emerged in both cultures. In the U.S. sample, two of the items for JI—"I am really a perfectionist about my work" and "Most things in life are more important than work"—loaded poorly on the JI factor. These same items also have been found to be poor measures of JI in other U.S. samples (Cummings & Bigelow, 1976; Lawler & Hall, 1970). These two items also had lower loadings compared to the other four items in the Indian data. The coefficient of congruence (Harman, 1967) for JI for the two sets of factor loadings was .98.

Satisfaction with work has the highest loading on the JS factor in the U.S. data, but satisfaction with coworkers and supervision load more highly in the Indian data. Satisfaction with work also cross-loads moderately (–.33) with the JI factor. The coefficient of congruence for JS for the two sets of factor loadings was .99.

From looking at the pattern of factor loadings, the coefficient of congruence, and the Cronbach alphas, it can be concluded that the measures for JI and JS are equally good for both cultures. Excluding the two poorly loading JI items would strengthen the measure further.

TABLE 3
Independent Variables that Entered and Stayed in the Stepwise Regression Analysis of Job Involvement and Job Satisfaction for the U.S. Data
($N = 267$)

Job Involvement			*Job Satisfaction*		
Variable	*Beta Value*	*R^2 After Entry*	*Variable*	*Beta Value*	*R^2 After Entry*
*Self-esteem	.29	.07	*Stress	–4.67	.18
*Tenure	.12	.11	*Variety	2.53	.30
Sex	–.37	.14	*Income	1.40	.33
Protestant ethic	.25	.16	Tenure	–.93	.35
Job variety	.14	.17	Job identity	1.87	.38

*Variables significant at the .0035 level. This significance insures that the probability of erroneously forming a model is held at the .05 level.

Stepwise Regression Analysis—The results of the stepwise regression analysis are presented in Tables 3 and 4. Predictors that significantly contributed at the .0035 level of significance, and at the .05 level (not controlling for the Type I error), are both indicated in the tables. It can be seen that the organization climate variable of self-esteem from the work setting and the demographic variable of either tenure or age are the most significant predictors of JI in both cultures. Additionally, in the Indian culture, Protestant ethic is also significant. For JS, job variety and stress are the

TABLE 4
Independent Variables that Entered and Stayed in the Stepwise Regression Analysis of Job Involvement and Job Satisfaction for the India Data
($N=307$)

Job Involvement			*Job Satisfaction*		
Variable	*Beta Value*	*R^2 After Entry*	*Variable*	*Beta Value*	*R^2 After Entry*
*Self-esteem	.41	.16	*Job variety	2.38	.14
*Age	.22	.22	*Stress	−2.49	.19
*Protestant ethic	.28	.25	*Communication	1.83	.22
Job variety	.21	.27	Job identity	.92	.23
Stress	.25	.28	Self-esteem	.84	.25
Feedback	−.13	.29			

*Variables significant at the .0035 level. This significance insures that the probability of erroneously forming a model is held at the .05 level.

two common predictors in the two cultures. Income is a third additional significant predictor of JS in the United States, but communication is the third additional significant predictor in India. Thus, there are at least two common predictors for both JI and JS in the two cultures.

Significance of the Differences in the Predictors in the Two Cultures in the Multiple Regression Models—Following Namboodiri, Carter, and Blalock's (1975) nonstandard test model, group membership variables were created for the U.S. and Indian data through dummy coding for the 14 predictors. These were regressed against JI and JS individually, using the SAS no-Intercept program. The differences for the first 14 predictors denoting the U.S. predictors, and the second 14 predictors denoting the Indian predictors, were tested through the SAS test models, first for global differences and then for differences in each of the 14 sets of predictors. This test model showed that for JI there was an overall difference in the 14 predictors for the two cultures, significant at the .02 level ($F=1.89$, *df* 14/521). Individual tests of significance for differences showed that only age was a significantly different predictor for the two cultures ($F=6.82$, *df* 1/521, $p=.009$). No other predictor was found to be significantly different.

Similar overall tests were done for JS. No significant differences, overall or individually, were detected for these predictors.

These results indicate that only age significantly differently predicted JI. All other variables were not significantly different predictors in the two cultures.

Discussion

The first research question raised in this study was to what extent the measures of JI and JS developed in the U.S. culture were appropriate for the Indian culture. Judged by the factor analysis results, it can be concluded that both measures are equally applicable to the two cultures. As a matter of fact, the Cronbach alpha for JI is even higher for the India sample and is evidence of cross-cultural application of the measure. The JI measure could be sharpened further by deleting the two items from the 6-item short measure, as previously discussed.

The second research question in this study was what, if any, were the similarities and differences among the predictors for JI and JS in the two cultures. This question has been answered by both the regression analysis and the tests of significance for the differences in the predictors. The stepwise regression analysis indicates that the organizational climate variable of self-esteem from the workplace is important for JI in both cultures. That is, when one feels that he/she is handling an important job, is doing the best at it, is successful and, in general, is happy and elated at the workplace, one understandably gets more ego-involved in the job. The next important common predictor for JI is the length of time one has spent in the organization. This is denoted by tenure in the U.S. culture and by age in the Indian culture. In the United States, tenure rather than age happens to be important, because people change organizations far more frequently than in India (the mean number of organizations worked for in the U.S. culture is 3.8, in India it is 1.3). Tenure as a predictor of JI is consonant with other studies on JI (Rabinowitz & Hall, 1977).

For JS, job variety and stress are the predictors common to both cultures. The greater the variety of skills and abilities that the job uses, the greater the satisfaction derived by the individuals from using their abilities and skills. Stress, on the other hand, reduces the amount of job satisfaction that one derives. Income is a significant predictor of JS in the U.S. but not in the Indian culture. The possible reason for this is that the income of U.S. employees incorporates merit raises, but salaries in Indian banks are governed by the National Bank Tribunal Award. The Award stipulates the same pay scales with graduated increments for experience for all employees. Communication regarding banks' policies, procedures, work systems, etc., is an important predictor for the JS of bank employees in India, but not in the United States. This could be due to differences in the hierarchical structures in the two cultures, or differences in the level of sophistication of the technology, or the sociopolitical systems. One needs to research into this area, further. However, it is interesting to note that there were no significant differences in the means of perceived communication in the two cultures.

The test models showed no differences in the predictors for JS in the two cultures. Only age seemed to predict JI differentially in the two cultures. The dynamics of the age variable have been discussed.

It is important to note that the stepwise regression technique is especially appropriate for the self-report cross-sectional data used in this study. Much of the method variance is removed after the first predictor has entered the model. Subsequent incremental explained variance is relatively free of method variance, particularly when there is no high correlation among the variables studied, as was the case in this study.

The applicability of measures and the importance of the common predictors in both the cultures should not come as a great surprise. Similar patterns of relationships in very different cultures among variables relating JI and other variables—for example, locus of control—have been found by other researchers, Reitz and Jewell (1979), for example. These relationships are stated to be not culture bound, even when there are differences in worker values across cultures. Ronen (1979) in his study has argued for the validity and universality of clusters in work goals and intrinsic-extrinsic work dimensions. Haire, Ghiselli, and Porter (1963) found that irrespective of culture factors or states of economic development, managers from a variety of countries, including the United States and India, assigned similar importance to the categories of needs. Based on this study and their own, Clark and McCabe (1972) stated that at least with respect to the need patterns, managers seem to live in a "uni-world." Perhaps this is true for other facets of organizational experiences such as JI and JS.

The results of this study would indicate that a manager should concentrate on job design and stress reduction to enhance the job satisfaction of employees in both cultures. Additionally, in the United States, the manager should increase employees' pay, if possible. In India the manager should improve communication with employees to increase the JS of employees.

This empirical study has indicated that there are perhaps more similarities than differences in cross-cultural studies. Properly designed multivariate studies can systematically trace those similarities and differences that would be useful to managers.

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A PATH-ANALYTIC STUDY OF THE CONSEQUENCES OF ROLE CONFLICT AND AMBIGUITY

ARTHUR G. BEDEIAN
ACHILLES A. ARMENAKIS
Auburn University

Since the initial pioneering work of Jacobson, Charters, and Lieberman (1951) on the use of the role concept in the study of complex organizations, there has been a growing literature exploring the relationship between role perceptions and work-related attitudes and behavior. In particular, considerable attention has been focused on the negative outcome of such role-related phenomena as role conflict and ambiguity. For example, both role conflict and ambiguity have been associated with job dissatisfaction, job-induced tension, lower organizational commitment, and propensity to leave an organization. Van Sell, Brief, and Schuler (1977) give a review of these relationships. Although such dysfunctional outcomes have been extensively documented, few attempts have been made to place the role metaphor into a multivariate context for the purpose of making causal inferences.

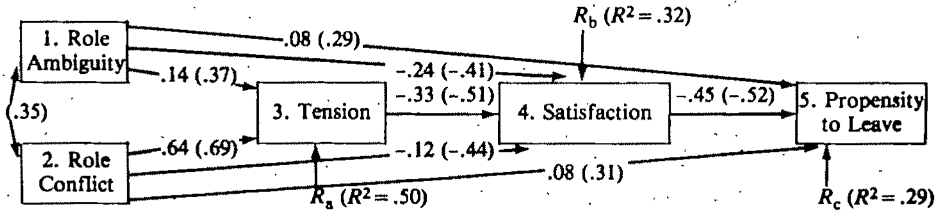
As recently as 1977, only three causal correlational analyses of the consequences of role conflict and ambiguity on various work-related outcomes had been attempted. Of these, two employed cross-lagged correlations (Miles, 1975; Szilagyi, 1977) and the third, path analysis (Oliver & Brief, 1977-78). Given the different purposes and different assumptions of these entirely different techniques (Billings & Wroten, 1978), the results of these three studies can hardly be considered interchangeable and certainly not conclusive. Indeed, with respect to the Miles (1975) and Szilagyi (1977) studies, Billings and Wroten have argued that despite statements to the otherwise (Feldman, 1975; Young, 1977), cross-lagged correlations are *not* appropriate "for testing causal inferences, but are only suited for testing the null hypothesis that the observed correlation between two variables is spurious. That is, that two variables are correlated only because each is related to a third variable, which may be unknown to the researcher and unmeasured" (1978, p. 679). This realization limits the current fund of knowledge dealing with the relationships between role conflict and ambiguity and various work-related outcomes when it is recognized that the one remaining study (Oliver & Brief, 1977-78) on which one must rely for such understanding leaves one question unaddressed. Oliver and Brief (1977-78) employed path analysis to investigate the consequences of role conflict and ambiguity, but they did not attempt to test whether the path coefficients they reported were consistent with the observed correlations between the variables analyzed. Without this verification, the network of causal relationships presented cannot be assured (Billings & Wroten, 1978).

Given the state of existing cross correlation/path analytic studies dealing with role-related phenomena, it would seem that an understanding of the interrelationships existing among role variables is lacking. To address this circumstance, the purpose of this study was to reinvestigate the consequences of role conflict and ambiguity on tension, job satisfaction, and propensity to leave an organization through the use of path analysis. Unlike cross-lagged correlation, path analysis is acknowledged as an especially appropriate and useful "technique for testing the consequences of proposed causal relationships among a set of variables" (Billings & Wroten, 1978, p. 677).

Theoretical Model

An essential aspect of path analysis is the construction of a hypothesized model of reality based on the state of current theory in the particular area being investigated. Given this theoretical base, the model is written as a set of cause-effect relationships. Figure 1 represents the hypothesized

FIGURE 1
Path Diagram of Hypothesized Model[a]



[a] Numbers in parentheses indicate zero-order correlations. Other numbers are path coefficients.

theoretical model of the current study. Two exogenous variables (1 and 2) are present in this model, and they are assumed to be independent of each other. The remaining three variables are defined as endogenous. Causality is presumed to flow in the direction of unidirectional arrows. Thus, the model in Figure 1 proposes that experienced role conflict and ambiguity have a direct and positive impact on both job-related tension and propensity to leave an organization, and a direct and negative effect on job satisfaction. In addition, satisfaction is hypothesized as directly affecting propensity to leave, and experienced tension is shown as indirectly affecting potential turnover through its effect on experienced satisfaction.

The model in Figure 1 is consistent with past research and theory. A review of the role literature (Van Sell et al., 1977) suggests that job-related tension is a direct function of role conflict (direct conflicts in which role obligations must be reconciled) and role ambiguity (lack of role clarity). Thus, according to the role literature, conflict and ambiguity should increase the probability that individuals will experience job-induced tension (Beehr & Newman, 1978). Such tension is seen as reflecting the extent to which an individual experiences psychological anxiety as a consequence of role-related matters. In turn, it has been generally argued that the occurrence of tension in the performance of job duties results in decreased job satisfaction and, consequently, an increase in the perceived desirability of leaving an organization (Brief & Aldag, 1976; Johnson & Graen, 1973). Whether these assumed cause-effect relationships are valid, however, has yet to be satisfactorily explicated.

Whatever the case may be, the results of the proposed path analysis will permit an evaluation of the consequences of the causal inferences advanced by assessing the focal relationships within a multivariate causal context. In doing so, it should provide increased confidence in understanding the outcomes of work-related role perceptions.

Method

Setting—The study was conducted in a Veterans Administration Medical Center of 1,100 beds. An estimated 60 percent of the center's work load was devoted to the care of mental patients (both acute and long term), with the balance of its activities devoted to acute and long term medical and surgical patients. The center is divided into 6 services and 24 wards. At the time of the study there were approximately 980 inpatients and 6,000 outpatients on the rolls.

Sample—The survey population was comprised of 460 staff at 5 levels in the center's nursing service, from whom 202 usable questionnaires were obtained and analyzed. The distribution of respondents included 93 nursing assistants, 36 licensed practical nurses, 56 registered nurses, 8 nurse practitioners, and 9 nurse administrators (department heads and program coordinators). All subjects except nursing assistants and licensed practical nurses were RNs. The sample included a representative cross-section of employees from all levels of the nursing hierarchy and from all departments. Of the sample, 115 (57 percent) were females. The average age was 39 and average length of service was 14 years.

Instruments—Role conflict and role ambiguity were measured by using six and eight items, respectively, from the scales developed by Rizzo, House, and Lirtzman (1970). Each scale was scored using a 5-point response mode ranging from "very false" to "very true," and by averaging across the relevant items. Both role conflict and role ambiguity (reversed) were scored so that the greater the score, the greater the perceived stress. These scales were chosen because of their established psychometric properties (Schuler, Aldag, & Brief, 1977) and wide usage in role theory research. A factor analysis for the present sample confirmed the unidimensional structure of both scales.

Tension was measured by a 9-item index taken from Lyons (1971). Developed from a longer list used by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964), this scale was specifically constructed to determine the frequency with which respondents report feeling bothered by a variety of work related factors. Response categories (coded from 1 to 5) were "never," "rarely," "sometimes," "rather often," and "nearly all the time." Items were averaged to yield a single tension score. A factor analysis of the 9-item index confirmed its unidimensionality as described by Lyons (1971).

Propensity to leave was gauged with a 3-item instrument developed by Lyons (1971) for use with nursing personnel. Response alternatives to each item were coded from 1 to 5 and averaged so that the greater the score, the greater the propensity to leave.

Satisfaction was assessed by a 6-item index taken from the scales developed by Taylor and Bowers (1972). Designed to be a "descriptive" measure, the index asks respondents for their perceptions of stated organizational practices and conditions. Response alternatives range from "to a very little extent" (the least favorable response, scored 1) to "to a very great extent" (the most favorable response, scored 5) and are averaged to yield a single score. This index was selected for use because of its simplicity in administration, its wide use in a diversity of settings, and its established validity and reliability (Franklin, 1975).

TABLE 1
Descriptive Statistics and Correlations for Study Variables[a]
($N = 202$)

Variable	*Reliability*	*M*	*SD*	*r*				
				1	*2*	*3*	*4*	*5*
1. Role ambiguity	.79	2.02	.60	—				
2. Role conflict	.89	2.66	.78	.35	—			
3. Tension	.86	2.58	.76	.37	.69	—		
4. Job satisfaction	.83	2.21	.94	−.41	−.44	−.51	—	
5. Propensity to leave	.76	3.76	.81	.29	.31	.39	−.52	—

[a] Correlations in this table ≥ .29 are significant at the .001 level.

Results

Table 1 presents the mean score, standard deviation, and coefficient alpha internal reliability estimates for each measure. Also shown are the intercorrelations among all the variables in the study. The correlation matrix indicates that role ambiguity and role conflict both are significantly related to all hypothesized consequences in the anticipated direction. Other correlations in the matrix are clearly meaningful within the conceptual framework of the study and provide support for the suggested linkages between the consequences of role ambiguity and role conflict when viewed as simple associations.

Figure 1 contains the results of the path analysis of the hypothesized model. It can be seen that the magnitude of the path coefficients strongly reinforces the a priori construction of the model. Satisfaction has a substantial, negative, direct effect on propensity to leave as predicted. This direct effect is a general indication of the importance of job dissatisfaction as a predictor of perceived desirability of leaving an organization after taking into account all other independent variables contained in the model. Stated differently, 45 percent of the standard deviation of propensity to leave is directly attributed to the unmediated effect of satisfaction. In contrast, although role conflict and role ambiguity both display significant zero-order correlations with propensity to leave, their direct effects on the latter appear negligible after accounting for the variation attributable to satisfaction. The high correlations between both role ambiguity and conflict and propensity to leave therefore can be interpreted as an artifact of the latter's shared high correlation with satisfaction.

Of the three predictors of satisfaction included in the hypothesized model, tension had the greatest impact. This thus suggests that although role ambiguity and conflict are both negatively related to satisfaction, the strength of the relationship lies through the path of the intervening variable (tension), rather than through a direct relationship.

Finally, role ambiguity and conflict show the predicted, positive effects on tension. Note, however, that the path coefficient representing the causal relationship between role conflict and tension is much larger than the similar coefficient between role ambiguity and tension. This suggests that, given the high correlation between role ambiguity and role conflict, role ambiguity is suppressing a greater portion of the variance in role conflict uncorrelated with satisfaction than vice versa.

In order to test the accuracy of the fit of the hypothesized model to the observed data, reconstruction of the original zero-order correlation matrix from the estimated parameters was attempted. Unless these reconstructed correlations can be shown to be consistent with the observed correlations, the computed path coefficients may completely misrepresent the causal relationships being investigated and should not be accepted. As Billings and Wroten state: "If a correlation cannot be reproduced, then something is amiss. A path was deleted when it should have been retained, residuals are correlated, or the ordering of variables is incorrect" (1978, p. 684).

The predicted correlations were computed following the procedure outlined by Kerlinger and Pedhazur (1973) for the decomposition of correlations into direct and indirect effects. The hypothetical model represented by Figure 1 was found to reproduce almost perfectly the observed zero-order correlations, the one discrepancy ($r_{35} = .34$ vs. $\hat{r}_{35} = .39$) being within the range of acceptability normally suggested (Kerlinger & Pedhazur, 1973). Thus, it can be safely concluded that the proposed model includes only significant coefficients, excludes no significant coefficients, and fits the observed data (Griffin, 1977).

Having determined that the proposed model in Figure 1 constitutes an accurate representation of the role scheme, given the stated causal assumptions, the model's "strength of causality" or "goodness" should also be evaluated. This involves assessing both the overall adequacy of explanation of the specified (restricted) model and the adequacy of the various independent variables in explaining each of the model's three endogenous variables. With respect to the latter, the adequacy of the independent variables is judged, in a predictive sense, by the R^2 terms (the proportion of explained variance) associated with each endogenous variable. As indicated in Figure 1, the interactions of the independent variables contained in the model explain 50, 32, and 29 percent of the variance in tension, satisfaction, and propensity to leave, respectively. Other things being equal, a low R^2 is considered less desirable than a large R^2 (Griffin, 1977).

The overall adequacy of the specified (restricted) model was evaluated using Kim and Kohout's (1975) large sample chi-square test (L), a generalization of Land's (1973) likelihood-ratio test statistic. This statistic is used to determine if the regression estimates under the general (full) model are the same as the estimates under the restricted model. In the present case, $L = .77$, $df = 1$, $p > .75$. This indicates that variance explained by the restricted model does not significantly differ from that explained by the full or general model, thus supporting the overall adequacy of the specified model.

At this point it should be noted that the final test of the adequacy of explanation of a model is the soundness of the theoretical rationale on which it is based. That rationale, together with a thorough critical examination of path coefficients, is the only "true" basis on which one model can be accepted as being more accurate than another (Miller, 1977).

Discussion and Summary

The present results clearly confirm the importance of role perceptions in understanding job-related attitudes. As predicted, role conflict and ambiguity were both associated with high levels of job-induced tension. In addition, the findings also showed that although both role conflict and ambiguity are also directly related to low levels of job satisfaction, they appear to have an even greater indirect effect on satisfaction through their effect on tension. Thus, the role variables investigated in this study achieve an even greater importance as they appear to have both direct and indirect effects on job attitudes.

The findings also reaffirm the importance of job satisfaction on the perceived desirability of leaving or staying in an organization. The observed impact of job dissatisfaction on propensity to leave carries a rather straightforward implication. The data suggest that organizations can favorably reduce attrition by assuring positive sources of job satisfaction.

Based on these findings, two conclusions are evident. First, by assuring that each role occupant has the necessary information to perform his or her job adequately and that the expectations received by a role occupant do not require incompatible behavior in the same job, an organization can clearly reduce the negative consequences associated with the role demands investigated in this study. Second, the findings of this study suggest the importance of investigating the impact of additional factors on role pressures. For example, research is available that suggests that personal characteristics may affect the relationship between perceived role expectations and employee behavior. Indeed, House argues that "evidence that a result does not generalize across major demographic groups suggests that there are important individual (physiological or psychological) or social environmental variables mediating the relationships in question" (1974, p. 24). As Beehr and Newman (1978) report, however, the number of studies reporting such effects is modest.

In sum, while achieving its primary purpose of evaluating the consequences of role conflict and ambiguity within a multivariate causal context, the results of the present study also serve the secondary purpose of underscoring the need for future investigations into the impact of additional factors (e.g., individual characteristics, differences in contexts, tasks, work-settings, and personal controls) on role perceptions. The increased knowledge resulting from the incorporation of such variables in future research will greatly enhance the understanding of role theory and, hence, knowledge of human behavior in organizations.

As with all similar research, the inferences drawn from this study must be tempered by the self-report and cross-sectional characteristics of the data. It thus should be recognized that the data analyzed represent individual perceptions and attitudes that may differ from "objective reality."

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ABSENTEEISM AND THE COLLECTIVE BARGAINING AGREEMENT: AN EMPIRICAL TEST[1]

DAN R. DALTON
Indiana University
JAMES L. PERRY
University of California, Irvine

Absenteeism has been described as a behavior that has "potentially critical consequences both for the person and the organization" (Porter & Steers, 1973, p. 151). As such, employee absenteeism has been a concern of practitioners and the focus of extensive research by organizational theorists. In a national survey, 79 percent of responding organizations reported that absenteeism was their most serious disciplinary problem (Bureau of National Affairs, 1973). One estimate indicated that 400 million work days are lost each year in the United States as a result of employee absenteeism (Yolles, Carone, & Krinsky, 1975). Recent reviews (Muchinsky, 1977; Porter & Steers, 1973; Steers & Rhodes, 1978) have underscored the impacts of absenteeism on the organization. Steers and Rhodes (1978), for example, suggested that, based on estimates of costs incurred in direct salaries, fringe benefits, temporary replacement, and administrative costs, absenteeism in United States' organizations may cost from $8.5 billion to over $20 billion per year.

Naturally, given the demonstrated seriousness of absenteeism, substantial research effort has been dedicated to identifying its associated variables. For instance, recent studies have examined absenteeism in a variety of contexts: employee age and tenure (Nicholson & Goodge, 1976; Nicholson, Brown, & Chadwick-Jones, 1977; Garrison & Muchinsky, 1977), organization size (Ingham, 1970), job satisfaction (Ilgen & Hollenback, 1977; Nicholson, Wall, & Lischeron, 1977), turnover (absenteeism as a predictor variable) (Waters & Roach, 1979), personality variables (Bernardin, 1977; Garrison & Muchinsky, 1977).

With the exception of Ingham's (1970) inquiry, these recent studies have focused on individual rather than organizational predictors of absenteeism. Bartol (1979) suggested and empirically supported the notion that this may be an important distinction with respect to employee turnover among professionals. It may be a viable distinction with respect to

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employee absenteeism as well. In addition, recent research, although focusing on antecedents of absenteeism, does not address the issue of the consequences of this behavior. Morgan and Herman (1976) posit that such consequences are a critical predictor of absenteeism.

The present research, then, seeks to examine organizational policy correlates that may affect the consequences of employee absenteeism. Noting the lack of empirical research in the general area of labor-management relations (Ash, 1970; Korman, Greenhaus, & Badin, 1977), such predictors may be found in the collective bargaining agreements between the organization and its employees. Investigations have not examined the relationship, if any, between relevant provisions of these collective bargaining agreements and absence rates of organizations. This may be a critical exclusion as certain absenteeism policy provisions that are legitimated by the language of the collective bargaining agreement may have the effect of making absenteeism "easier" or more profitable for the employee, thereby leading to higher absence rates for the organization. Such provisions may lead to distinctly different consequences relative to employee absenteeism. Several such provisions that may be associated with organizational absence rates have been chosen for examination in this study. It should be noted that this investigation will rely on provisions of various collective bargaining agreements. Formal agreement between management and organized labor, however, is not a requirement. Any organizational absenteeism policy may be expected to affect the consequences of this behavior. Any organization, public or private, with or without formal contractual relations with organized labor may have absenteeism policy provisions that may affect employee absenteeism. Given the possible impact of absenteeism policy on employee behavior, the following hypotheses are developed.

Hypotheses

The amount of money earned by employees of the organization may affect the organizational absence rate. As income increases, employees may "buy" leisure time by being absent: a substitution effect. Simply, they may be able to afford to be absent. Alternatively, it could be argued that as employee income increases, absenteeism is less likely to occur (income effect). In this case, absenteeism is relatively expensive because of income forgone. Within the sample organizations, however, the substitution effect may be more likely because employees do not sacrifice their entire income when absent. Rather, they receive from 75 percent to 100 percent of their ordinary wage, depending on their particular collective bargaining contract provisions. A positive association, therefore, is hypothesized between peak wages as defined by the agreement and the absence rates of the sample organizations. Peak wage was chosen rather than mean wage because just over 80 percent of the operational employees of the sample organizations receive (have sufficient seniority to receive) the maximum wage. This is not a function of an unusual level of seniority in the industry but of rather truncated wage progression schedules. The time required to progress from base rate to peak wage averages less than 18 months for these transit properties. The choice, however, between peak and mean wages is of little statistical consequence as these metrics are very highly correlated (.94, $p<.001$).

There also may be a systematic relationship between absence rates and the requirements to establish proof of illness (doctor's certification). The collective bargaining contracts differ on this policy: certification is required by some of the sample organizations and not by others. It is expected that organizations that do not require certification will have higher rates of absenteeism.

The rate at which paid sick leave accumulates may be an important determinant of absence rates. For instance, an organization may allow ½ day per month to accumulate. At this rate, employees would earn six paid days of sick leave per year. Another organization may allow the accumulation of 1½ days per month, which amounts to 18 paid days per year. It is suspected that organizations that provide more sick days per year may have higher absenteeism rates.

The policy covering the disposition of unused sick leave benefits may also influence absenteeism rates. Suppose, for example, that an organization has no provision for unused sick leave. In other words, if employees leave the organization with 45 earned days of sick benefits "on the books," they would receive no compensation for these unused days. Other organizations pay (usually some percentage rate rather than at par) departing employees for their accumulated, but unused, benefits. It is expected that organizations that do not reimburse unexpended benefits will have higher rates of absenteeism.

Method

Data were collected through site visits to 29 west coast organizations that provide essentially identical transportation services (urban mass transit). Data on the following variables were collected.

Absenteeism was measured by calculating the ratio of the total number of absent hours to total hours worked by all operations employees (bus drivers). Although it is recognized that some portion of absent time is essentially unavoidable, it is hypothesized that total absence time, irrespective of its nature, will be systematically related to absenteeism policy contractual provisions. In the subject organizations this index of absenteeism ranged from a low of 2 percent (indicating that the average employee was absent 2 percent of the time) to a high of 15 percent (indicating that the average operations employee missed 15 percent).

Peak wage rate was determined by inspection of the labor contract in effect during this research. The range was $4.40 to $7.66 per hour.

Proof of illness is also a contractual provision. Such certification was either required by the contract or it was not.

Sick benefits accumulation rate, again, is determined by the contract. The range for this variable is from ½ day per month to more than 1½ days per month.

Unused sick leave policy is determined from the contract as well and is binary for purposes of this analysis. Employees either receive some compensation for unexpended sick leave or they do not.

Results

Table 1 illustrates the associations between the absence rate of the subject organizations and the collective bargaining contract provisions enumerated by this study that may affect the consequences of absenteeism for employees. Because of a relatively small sample size ($n = 29$) and the resultant possibility of some skewness in the data, Spearman's rho is given in Table 1 along with Pearson's product moment correlation for purposes of comparison.

TABLE 1

Zero and First Order Correlations between Organizational Absence Rates, Dependent, and Control Variables

	Absence Rate and:			
	Peak Wage	*Proof of Illness*	*Sick Benefits Accumulation Rate*	*Unused Sick Leave Policy*
Zero-Order	*.49*[a]* *(.41*[b])*	*−.13[a]* *(−.18[b])*	*.69**[a]* *(.72**[b])*	*.44*[a]* *(.54[b])*
Controlling for:				
Organization size	.73***	−.18	.67**	.51*
Peak wage	—	−.12	.64**	.22
Proof of illness	.50*	—	.73**	.44*
Sick benefits accumulation rate	.29	−.35*	—	.20
Unused sick leave policy	.39*	−.14	.61**	—

[a] Pearson product moment correlations.
[b] Spearman's rho.
*$p < .05$
**$p < .01$
***$p < .001$

With the exception of the proof of illness relationship, the hypothesized associations are empirically supported. It seems that organizations that pay operators a higher rate, allow sick benefits to accumulate at a faster rate, and do not remunerate earned, but unused sick leave have higher absence rates.

There are two potential issues that should be addressed in order to interpret these results responsibly: (1) effects of additional organizational level variables on the observed associations and (2) the relationships, if any, among the independent variables. Child (1977), for example, indicated that there are three main factors having major effects on organizational level associations: technology, environment, and organizational size. The possibility of technological and environmental factors having affected the reported associations is minimized in the subject organizations. As previously noted, these organizations provide essentially identical services (fixed-route bus transit) with essentially identical technologies. Their equipment and technologies at the operational level are undifferentiated. The organizational environments in which these services are provided have nearly identical characteristics. Although these organizations are subject to external constraints principally as a function of substantial subsidizing by state and federal agencies, they (the subject organizations) are uniformly affected.

The sizes of these organizations, however, vary considerably, from a few dozen vehicles to more than 2,000. Perhaps the associations are not explained by systematic relationships between contractual provisions and absence rates, but rather by relationships between absenteeism and organizational size and the prevalence of certain absenteeism policy provisions in contracts for larger (or smaller) organizations. The size of the organization, then, may be a matter of some concern.

An additional concern may be the issue of interrelationships among the independent variables. Table 2 illustrates those relationships along with those with organizational size.

TABLE 2
Interrelationships between Absence Rate, Organizational Size and the Independent Variables

	1	*2*	*3*	*4*	*5*	*6*
1 Absence rate		−.23	.49*	−.13	.69**	.44*
2 Organizational size[a]			.49*	−.08	−.18	.03
3 Peak wage				.10	.36	.15
4 Proof of illness					.00	.01
5 Sick benefits accumulation rate						.34*
6 Unused sick leave policy (no remuneration for earned, but unused sick leave)						

[a] Number of revenue vehicles, an industry standard for describing the size of a transit property.
*$p < .05$
**$p < .01$

As indicated in Table 2, there are relationships between organizational size and among the independent variables. These associations are not large, but they are matters of potential concern. Table 1 illustrates the effects of controlling for the effect of organizational size and the statistically significant interrelationships among the independent variables.

As evident from the correlations in Table 1, the zero-order correlations between the study's "independent" variables and the absence rate criterion generally are not greatly reduced by the partialling procedure. In three instances, however, the partialling procedure results in marked decreases in the observed relationships (e.g., the correlation between peak wage and absence rate controlling for sick benefits accumulation rate). These results suggest that the several independent variables *do not* operate independently of one another in accounting for variance in the absence rate criterion.

Discussion

The results of this study are supportive of the general hypothesis. That is, certain collective bargaining contract policies may be moderately strong correlates of organizational absence rates. It has been suggested that certain of these provisions may have the effect of making absenteeism easier or more profitable for the employees. This tendency may lead to higher absence rates for the organization. Arguably, provisions such as relatively generous accumulations of sick leave are not stringent absenteeism control measures.

In an earlier study, Morgan and Herman (1976) reported that past absenteeism was a very good predictor of future absenteeism ($p = .70$). Individuals who have been absent evidently are not hesitant to be so again. Morgan and Herman's research led to an interesting conclusion:

> The results indicate that for some employees absenteeism provides an opportunity to experience consequences that tend to encourage absenteeism and that are not offset by organizationally controlled consequences that would tend to deter absenteeism (1976, p. 738).

The present study may be supportive of their major conclusion. There seems to be evidence that organizational absence rates are related to organizational control policies and practices related to absenteeism, at least as enumerated by the collective bargaining agreement.

Many organizations are relatively generous with their absence provisions. For example, some organizations in this sample provided for the accumulation of 18 (1½ days per month) days per year of sick leave. Under these circumstances, it is difficult to argue that employees do not experience consequences that tend to encourage absenteeism. Again, it should be emphasized that some employee absenteeism is largely unavoidable. Still, it is fascinating to note the strength of associations between organizational absence rates and the selected contract provisions.

This study is exploratory in nature. To the authors' knowledge, it is the first examination of organizational absence rates in relation to collective bargaining provisions that set parameters on absence behavior. Several caveats may be in order. The homogeneity of the sample actually presents something of a paradox. Positively, technological and environmental factors that may affect organizational level inquiry may have relatively little impact in this case because these factors are largely undifferentiated among the subject organizations. However, the homogeneity of the sample and the relatively small sample size ($n = 29$), may limit the generalizability of the results. Also, although the organizational environments may be similar, the *individual* environments from which the absence rates are aggregated are not subject to control in this study. For example, regional leisure patterns, unemployment, and so forth may affect the absence behavior of employees differentially depending on the particular area of employment. This may have minimal effect because in this case all subject organizations are located in the same state. Nonetheless, there may be regional differences. This remains an empirical question.

Even so, given the ordinarily low associations between attitude-attendance relationships (Locke, 1976; Steers & Rhodes, 1978) and the caution that further replication of the attitudinal-withdrawal relationships may not be particularly fruitful (Mobley, Horner, & Hollingsworth, 1978), it appears that investigations into such areas as consequences of absenteeism may be in order. The present authors agree with Porter and Steers (1973) that understanding of the manner in which actual withdrawal decisions are made is far from complete. An examination of control policy, contract language, and various other practices that may affect the consequences of absentee behavior may be a responsible direction for future research.

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AN EMPIRICAL EVALUATION OF REPEATABLE TESTING AS A TECHNIQUE FOR IMPROVING MANAGEMENT EDUCATION

E. LAUCK PARKE
University of Vermont
JOHN R. SCHERMERHORN, JR.
Southern Illinois University, Carbondale
LARRY SHIRLAND
University of Vermont

College instructors face numerous challenges when teaching students, and the hour exam can be a particular source of frustration. Students often express after an exam that they were surprised to learn what the instructor considered important, that they didn't realize how picky the instructor was going to be, or that they simply had a bad day because of multiple exams, illness, etc. Such complaints can cause the instructor to doubt whether or not the grades earned by these "surprised" and/or "bad day" students are true reflections of learning. To the extent that the excuses are valid, students' knowledge and understanding of the material could well be higher than that represented by their test scores. The instructor also may become frustrated by the decline in classroom climate that sometimes occurs at exam time. It is unfortunate to work hard to build rapport with students, only to see morale suddenly nose-dive after an exam.

The present paper reports an empirical evaluation of repeatable testing as a means of avoiding such frustrations. This investigation, conducted in an introductory undergraduate course in organizational behavior, offers insights to the concerned management educator.

Background

Repeatable testing involves giving students the opportunity to take a test, receive feedback, engage in additional study, and then take another test to measure performance improvement. Feedback, or knowledge of results, is a key element in this instructional technique. The motivation theories of McClelland (1965) and Locke (1968) consider feedback to be a performance incentive. Feedback also is important in applications of reinforcement theory to both the work (Luthans & Kreitner, 1975) and the learning (Skinner, 1958) settings. Nevertheless, research remains inconclusive as to the value of feedback as a source of performance improvement (Latham & Yukl, 1975; Locke, 1977). The literature is similarly vague in demonstrating the pedagogical value of the repeatable testing technique.

Although retesting is central to personalized instruction under the Keller (1968) plan, it has received scant attention in other forms. Golden, Fuller, and Jensen (1974) studied repeatable testing in a college physics course. They report that exam discussions were no longer arguments over scoring details, students reacted favorably on their course evaluations, and student grades tended to increase on the retest exam. Golden et al. concluded that the use of retesting can create a positive change in the social and learning environments of the classroom. Their methodology, however, fails to give adequate support to these strong positive evaluations.

A more methodologically sound study was conducted by Gluckman (1973). Two sections of an elementary level junior college algebra course were used as a treatment and control group. The treatment group was allowed to retest on semester exams. Results, measured on both an instructor-prepared final exam and on a standardized achievement test, showed no significant difference in the final achievement of students in the two groups. Gluckman concluded that from a learning perspective, retesting is at least as effective as not retesting: that is, the use of retesting will probably not compromise learning outcomes. However, he warned that retesting uses considerable administrative time and that the students may use the retest option to procrastinate on their studies. Gluckman's study is not a strong endorsement of retesting.

Evaluation Research Hypotheses

Repeatable testing should be evaluated in respect to its impact on both student learning and student course attitudes. Suchman (1967) advises that good evaluation studies are hypothesis-testing research. Accordingly, two research hypotheses were specified for an evaluation of repeatable testing in the organizational behavior course. Because the literature review is inconclusive, the hypotheses are written in the null form.

Hypothesis 1: The learning achieved by students exercising a retest option will not differ from the learning achieved by students not allowed the retest option.

Hypothesis 2: The attitudes of students toward their course and instructor(s) will not differ between those who are allowed a retest option and those who are not allowed a retest option.

Method

During the fall semester of 1978, an experiment was designed to test the research hypotheses using students enrolled in an introductory course in organizational behavior. A total of 125 students participated in the study: 65 percent were business majors; 15 percent came from engineering, home economics, and social work for which the course was a requirement; and the remaining students were from fields such as computer science, arts and science, statistics, education, and agriculture. Of the participating students, 44 percent were female. All students had completed one prerequisite course in either introductory sociology or psychology and had accumulated a minimum of 60 degree credit hours.

Research Design—The team-teaching format of the course included a common lecture to all students once a week, followed by smaller laboratory groups individually managed by three instructors. Students were randomly assigned within lab sections to one of two treatment groups. One group of students was allowed the retest option on the first hourly exam. Students in the second group were allowed the retest option on the second hourly exam. This procedure insured that no student was denied access to the potential benefits of retesting. Each student could use the option once during the semester.

The evaluation used a twice repeated post-test-only control group experimental research design (Campbell & Stanley, 1966). Subjects randomly assigned to the treatment group in the first exam case became the control group for the second exam case, and vice versa.

Dependent Variables—Two dependent variables were operationalized: learning improvement and course attitudes. Learning improvement was measured as the increase in percentage performance on final exam review material as compared to hourly exam performance on equivalent subject matter. The final exam included special sections of first exam and second exam review material. These sections were separately scored and compared on percentage terms to the student's original exam scores. The percentage change from the original exam to final exam review material constituted a learning improvement used to test Hypothesis 1.

The second dependent variable measured students' attitudes toward the course instructors. A 25-item attitude survey was designed for the experiment. It was administered to the first class session following each hourly exam, but prior to the retest exam. A principal factors analysis with varimax rotation led to the creation of factor scores measuring student course attitudes on the following dimensions: overall satisfaction, exams and textbooks, practicality of material, opportunity for independent thinking, instructional support in lab, and personal involvement and challenge in lab.

Method of Analysis—To test Hypothesis 1, students were divided into two groups. Group 1 represented students exercising their retest option on the first hourly exam and group 2 represented students not having the retest option on this exam. The student *t* test was used to compare the final learning improvement scores of these two groups for the first exam review material. A similar procedure was used to test the hypothesis for learning improvement scores based on second exam review material.

To test Hypothesis 2, mean scores for the relevant attitude dimensions for each post-exam attitude survey were compared across groups. Two analyses were made, one using each item score individually and one using the items defining the dimensions of the factor analysis. Again, the student *t* statistic was used to test the significance of differences in the mean scores reported by the two groups. A significance level of .05 was selected for rejection of the null hypotheses.

Results

Differences in Learning Improvement—Table 1 displays test results of Hypothesis 1. The data show that retesters scored better on the average than did the control group on the first exam learning improvement, although the difference is not statistically significant. The table does show a statistically significant difference between retesters and nonretesters on the second exam learning improvement. Thus, there is tentative support in these data for rejecting Hypothesis 1 in its null form.

TABLE 1

Comparison of Final Exam Performances on the Hourly Exam Review Material by the Experimental and Control Groups

	Sample Size	*Improvement in Learning*	*t-test*	*Significance Level*
Students retesting on the first hourly exam	44	11.8	1.27	.209
Control group	47	8.0		
Students retesting on the second hourly exam	25	19.4	2.38	.020
Control group	58	13.3		

These mixed results raise a question of whether or not other influences acted to obscure the value of retesting as measured by learning improvement. There is the chance that grading varied among instructors and biased the results. Every effort to coordinate grading was made, however, and an analysis of variance revealed no systematic differences. The benefits of retesting may also vary among students in accordance with their basic academic capabilities. To examine this supposition, students were classified as high or low performers according to their total scores on exams 1 and 2. Students scoring above the median were classed as high performers; those below the median became low performers. The reasonableness of this definition was verified by performing the same analysis using the median grade point average of students enrolled in the course. The conclusions of both analyses are identical. Results using the median exam score are reported in Tables 2 and 3.

Table 2 indicates that high performers exercising the retest option performed significantly better than did those who did not retest. Table 3 shows no significant difference between low performers who retested on the hourly exam and those who did not. Thus, Hypothesis 1 can be rejected for the high performing group of students. It can be concluded that

TABLE 2
Comparison of Final Exam Improvement By High Performers

	Sample Size	Improvement in Learning	t-test	Significance Level
High performers retesting on the first exam	20	10.52	2.49	.016
High performers not retesting on the first exam	30	1.51		
High performers retesting on the second exam	11	15.42	2.36	.023
High performers not retesting on the second exam	39	8.40		

TABLE 3
Comparison of Final Exam Improvement By Low Performers

	Sample Size	Improvement in Learning	t-test	Significance Level
Low performers retesting on the first exam	24	12.87	-.47	.642
Low performers not retesting on the first exam	26	14.68		
Low performers retesting on the second exam	14	22.5	1.54	.129
Low performers not retesting on the second exam	47	16.4		

retesting did have a positive effect on the learning achievements of high performing students. No such conclusion is possible for low performing students.

Differences in Course Attitudes—The only significant difference in attitudes between treatment groups occurred on the first exam and in respect to the factor, practicality of material. Students in the retest group for exam 1 viewed course material as more practical than did their nonretest counterparts. On all other factor dimensions and for both exams, no significant differences were found. The same result emerged when differences were compared for each attitude item rather than for factor scores. Accordingly, Hypothesis 2 cannot be rejected. Retesting had no apparent effect on student course attitudes.

Discussion and Implications

For this sample of students, retesting had no positive impact on student course attitudes and only increased learning for students who were already high academic performers. In semesters past, the authors had been willing to invest substantial amounts of faculty time and other resources to administer repeatable testing. In respect to this resource investment, these evaluation results support those of Gluckman (1973) and suggest that the cost-benefit ratio may not be favorable. Retesting is costly in terms of faculty time, clerical resources, and teaching assistance. Its intended benefits of increased learning and improved student course attitudes appear suspect. At best, only the high performing students improve their learning with the retest option. Given limited resources and the results of this evaluation, a decision was made to eliminate repeatable testing in the organizational behavior course. This conclusion is limited in generalizability. Still, it is based on a rigorous evaluation study.

For those interested in further research, the following issues deserve consideration: (1) A "leveling" effect may have occurred as students felt less confident about the material for which they had not had the retest option. A disproportionate amount of study time may have been allocated to this latter material at the expense of material on which they had been retested. This leveling effect may have distorted the reported results. (2) Some students may have used retesting to juggle their study and examination schedules or to advance their grades without actually restudying the material. Both strategies were possible under the retest rules, and observations indicate that a number of students did manipulate the retest along these lines. To the extent that such behavior occurs, expected beneficial learning effects of the retest option may be thwarted. (3) The timing of the attitude surveys may have adversely affected the results. Had the exam grades been distributed before attitudes were measured, stronger attitude differences may have been noted. (4) It may not be reasonable to assume that this research design treated the experimental and control groups differently because, in essence, every student was given one retest option. Strictly speaking, the retest option should have been given to one group of students and denied the other. It is difficult in the classroom setting, however, to deny a potentially valuable experience to one group of students.

Conclusion

Faculty time is a precious resource that must be allocated among competing uses. It is critical that alternative investments in instructional methodologies be systematically evaluated. Time invested in a mediocre or poor method can deny students and their instructors access to other more worthwhile activities. In seeking to make sound choices, however, instructors must be cautious in trusting their "gut" reactions as to what will and/or ought to work well. It is important, periodically, to accomplish rigorous empirical evaluations of instructional methods. Evidence from the present study supports this latter appeal at the same time that it casts doubt on the values of repeatable testing as a pedagogical technique.

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NOTES ABOUT AUTHORS

Ahmed A. Abdel-Halim, who received his Ph.D. from the University of Illinois at Urbana-Champaign in 1971, is Professor of Management and Organizational Behavior at Illinois State University (Illinois State University, College of Business, 439 Stevenson Hall, Normal, IL 61761). His current work includes research on power equalization and participative management, role stress, task design, leadership behavior, and work motivation. He has had several articles published in *Personnel Psychology, Human Relations, Journal of Occupational Behaviour*, and *Organizational Behavior and Human Performance.*

Achilles A. Armenakis is Director of the Auburn Technical Assistance Center and a member of the support faculty of the Graduate Program in Industrial-Organizational Psychology at Auburn University. His primary research interests are in organization development, research methodology, and organization behavior. He presently serves on the editorial review board of the *Journal of Management.*

Hugh J. Arnold is an Assistant Professor of Organizational Behavior in the Faculty of Management Studies at the University of Toronto (University of Toronto, Faculty of Management Studies, 246 Bloor Street West, Toronto, Ontario, Canada M5S 1V4). He holds degrees in Psychology from the University of Alberta and Oxford University, and obtained his M.A. and Ph.D. in Organizational Behavior at Yale University. His publications have appeared in *Organizational Behavior and Human Performance* and the *Journal of Applied Psychology.*

Arthur G. Bedeian is an Associate Professor of Management at Auburn University and a member of the support faculty of the Graduate Program in Industrial-Organizational Psychology (School of Business, Department of Management, Auburn University, Auburn, AL 36830). His major research and teaching interests are in the areas of organization theory and work group behavior. He currently serves on the editorial boards of the *Academy of Management Review, Journal of Management*, and *Review of Business and Economic Research.* He is a member of the American Sociological Association and a Fellow of the Academy of Management. He has authored or co-authored over 40 articles and is the author of *Organizations: Theory and Analysis* (Dryden Press, 1980).

Steven J. Clark is a software engineer with the Software Support Center at Warner Robins Air Logistics Command. He received his B.S. in Electrical Engineering and M.S. in Operations Management at Auburn University, and has published in *Computers and Industrial Engineering.*

Daniel S. Cochran is an Associate Professor of Management at Mississippi State University (Management Department, Mississippi State University, Mississippi State, MS 39762). He also has taught at Sam Houston State University in Huntsville, Texas. He received his Ph.D. from the University of Arkansas in 1978. Dr. Cochran has conducted research studies and been involved in consulting activities dealing with conflict and stress management, organizational communications, and management development and training.

James F. Cox is an Associate Professor of Industrial Management at Auburn University (Department of Management, School of Business, Auburn University, Auburn, AL 36830). He received his Ph.D. in Engineering Management from Clemson University. He has published in *Simulation, Production and Inventory Management, Computers and Industrial Engineering, Interfaces, Industrial Engineering*, and other journals.

Dan R. Dalton is an Assistant Professor of Administrative and Behavioral Studies at the Graduate School of Business, Indiana University (Graduate School of Business, Indiana University, Bloomington, IN 47401). He received a Ph.D. degree in Administration from the University of California, Irvine in 1979. Recent publications include those in the *Journal of Applied Psychology* and the *Academy of Management Review* in the areas of union-management relations and employee withdrawal behaviors.

Daniel C. Feldman currently is an Assistant Professor of Organizational Behavior and John L. Kellogg Research Professor at Northwestern University's J. L. Kellogg Graduate School of Management. Before joining Northwestern, Dr. Feldman was on the faculty of Yale College and University of Minnesota Industrial Relations Center. Professor Feldman received both his M.A. in Administrative Sciences and his Ph.D. in Organizational Behavior from Yale University, and his B.A. in sociology from the University of Pennsylvania. His research interests include organizational socialization, job choice, career development, small group behavior, and organization change. He has authored articles for *Administrative Science Quarterly, Human Relations, Organizational Dynamics*, and *Journal of Applied Psychology* on these topics. He currently is working on a large scale research project on internal transfers and promotions.

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Jeffrey D. Ford is an Associate Professor of Administrative and Behavioral Studies in the School of Business at Indiana University (Graduate School of Business, 1300 West Michigan, Indiana University, Indianapolis, IN 46202). He received his Ph.D. in Organizational Behavior from The Ohio State University. Dr. Ford currently is investigating the management of organizational decline and the role of decision makers in the design of organizations.

Kathryn Rudie Harrigan is an Assistant Professor of Business Administration at Columbia University (Graduate School of Business, Uris Hall, Columbia University, New York, NY 10027). She received the D.B.A. from Harvard University and was the 1979 recipient of the General Electric Award for Outstanding Research in Strategic Management. Dr. Harrigan was selected as IBM honorary research fellow by the American Association of University Women for her research concerning declining industries. Her current research includes industry structural dynamics, strategic planning, and corporate governance. She formerly taught at the University of Texas at Dallas.

William Hicks, an advanced graduate student in the Industrial/Organizational Psychology program at The Ohio State University, is employed at Battelle Columbus Laboratories in Columbus. His interests include research in the impact of organizational design and organizational policy on individual and organizational behavior.

Richard Klimoski is an Associate Professor of Industrial/Organizational Psychology and program director at The Ohio State University (Department of Psychology, The Ohio State University, 404 C West 17th Avenue, Columbus, OH 43210). He did his graduate work at Purdue University. He has done research on the impact of technology on worker attitudes and is currently involved in studies on the effects of organizational context on performance evaluation and personnel assessment.

Abraham K. Korman is Professor of Psychology at Baruch College and head of the Ph.D. specialization in Organization Behavior (Baruch College, City University of New York, 17 Lexington Avenue, New York, NY 10010). His research and teaching interests have been basically in the areas of motivation, leadership, and alienation, and he is the author of articles and textbooks in each of these areas. His most recent book, co-authored with R. W. Korman, is entitled *Career Success/Personal Failure* and reflects the interests of this article. Published by Prentice-Hall, it is designed for both academic and nonacademic audiences.

David Krackhardt received his B.S. from Massachusetts Institute of Technology. He currently is in the Ph.D. program at the University of California, Irvine (Graduate School of Administration, University of California, Irvine, CA 92717).

Dorothy Lang is an Instructor of Management at Rutgers University in Newark and is completing her Ph.D. with a specialization in Organizational Behavior in the Business Program at City University of New York. She holds an M.B.A. from Baruch College and an A.B. from Columbia University at Barnard. Before entering the academic world, she worked in marketing research at AT&T and served as project director for several marketing research consulting firms. She has co-authored an article published in the *Journal of Marketing*.

Donald R. Latham is an Assistant Professor of Management at the Univeresity of Mississippi (Management Department, School of Business Administration, University of Mississippi, University, MS 38677). Before coming to Vermont, he taught in the Industrial Engineering Department at the University of Wisconsin–Madison. His current research interests include worker-centered quality control and organizational behavior modification.

John McKenna received his Ph.D. from the University of California, Irvine. He currently is Assistant Professor of Management at California State University, Chico.

E. Lauck Parke is an Assistant Professor of Business Administration at the University of Vermont (Votey Building, University of Vermont, Burlington, VT 05405). He received his Ph.D. in Management from the University of Massachusetts. Before going to Vermont, he taught in the Industrial Engineering Department at the University of Wisconsin–Madison. His current research interests include: worker-centered quality control and organizational behavior modification.

James L. Perry is an Associate Professor of Administration at the Graduate School of Administration, the University of California at Irvine. He received his Ph.D. degree in Public Administration from Syracuse University in 1974. The primary foci of his recent research and publications are in public sector labor relations.

Lyman W. Porter received his Ph.D. from Yale Univeresity. He currently is Professor and Dean of the Graduate School of Administration, University of California, Irvine.

Earl H. Potter III has served in line and staff positions with the U.S. Coast Guard. He received his Ph.D. from the University of Washington in 1978, and is now an Assistant Professor of Psychology at the United States Coast Guard Academy (Department of Humanities, U.S. Coast Guard Academy, New London, CT 06320).

Thomas J. Scanlan is an Assistant Professor at Manhattan College, New York. He received his B.A. in Physics from the Catholic University in Washington, his M.A. in Mathematics from New York University, and his Ph.D. in Organizational Behavior from Columbia University. His research and writing interests are in the areas of communication and corporate social responsibility.

John R. Schermerhorn, Jr., is an Associate Professor and Chairperson in the Department of Administrative Sciences, Southern Illinois University at Carbondale. His M.B.A. in Management and International Business is from New York University, and he has a Ph.D. in Organizational Behavior from Northwestern. Dr. Schermerhorn's papers have been presented at various professional meetings and have appeared in the *Journal of Health and Social Behavior, Academy of Management Journal, Journal of Management*, and *Health Care Management Review*. His current research deals with interorganizational cooperation, organization change processes, and the classroom as a learning organization.

Uma Sekaran is an Assistant Professor of Administrative Sciences at Southern Illinois University, Carbondale (Department of Administrative Sciences, Southern Illinois University, Carbondale, IL 62901). She received her M.B.A. from the University of Connecticut and Ph.D. from the University of California at Los Angeles. Dr. Sekaran has held administrative and managerial positions in the banking industry. Her continuing research includes interests in job design and cross-cultural studies in O.B. Currently she is engaged in a special project investigating the dynamics of dual career families and their implications for organizational change.

Larry E. Shirland is an Associate Professor of Business Administration at the University of Vermont. He received his Ph.D. in Industrial Engineering from Oregon State University. Dr. Shirland's current research interests include special cases of the vehicle dispatch problem and applications of goal programming.

Richard M. Steers received his Ph.D. from the University of California, Irvine. He currently is Associate Professor of Management at the University of Oregon.

David W. Stewart obtained his B.A. from Northeast Louisiana University and his M.A. and Ph.D. in Psychology from Baylor University. He has held the positions of Research Psychologist and Director of Training within the Louisiana State Health System and Research Supervisor for a major Chicago advertising firm. His publications have appeared in the *Journal of Marketing Research, Journal of Applied Psychology, Professional Psychology*, and other journals. He currently is a member of the faculty of the Owen Graduate School of Management, Vanderbilt University.

Michael L. Tushman is an Associate Professor at the Graduate School of Business, Columbia University (Graduate School of Business, Uris Hall, Columbia University, New York, NY 10027). He received a Master's degree from the School of Industrial and Labor Relations at Cornell University and a Ph.D. from the Sloan School of Management at Massachusetts Institute of Technology. Dr. Tushman's general research interests focus on problems in the management of innovation, with a particular interest on the impact of communication networks on the innovation processes.

Donald D. White is a member of the Management Department at the University of Arkansas. He received his Ph.D. from the University of Nebraska-Lincoln. Dr. White has conducted seminars for health care administrators in both the United States and Europe. He has published articles in the *Academy of Management Journal, Personnel Administration, The Personnel Administrator*, and the *Journal of Business Research* and is co-author of *Action in Organizations* (Allyn and Bacon). Dr. White has served as a member of the Board of Directors of the Southern Management Association and has been an active participant in the Academy of Management.

Ursula Wittig-Berman is an Adjunct Lecturer of Industrial-Organizational Psychology at Baruch College and is completing her Ph.D. in the Business Program at City University of New York with a specialization in Organizational Behavior. She received her B.A. from Brooklyn College and her M.B.A. from Baruch College, The City University of New York.

Robert W. Zmud is an Associate Professor of Information Systems at Georgia State University. He received a B.A.E. at the University of Virginia, an M.S. at M.I.T., and a Ph.D. at the University of Arizona. Dr. Zmud's publications have appeared in *Management Science, Decision Sciences, MIS Quarterly, Academy of Management Review, Personnel Psychology*, and the *Journal of Management*.

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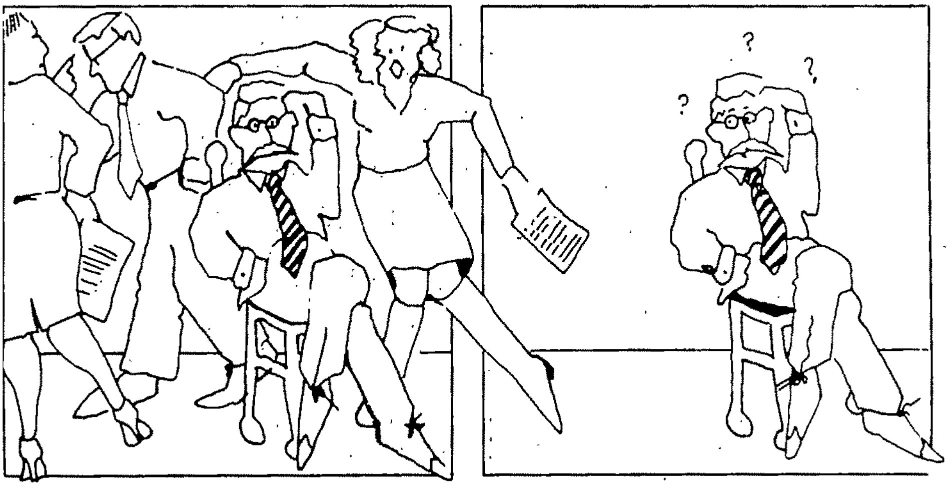

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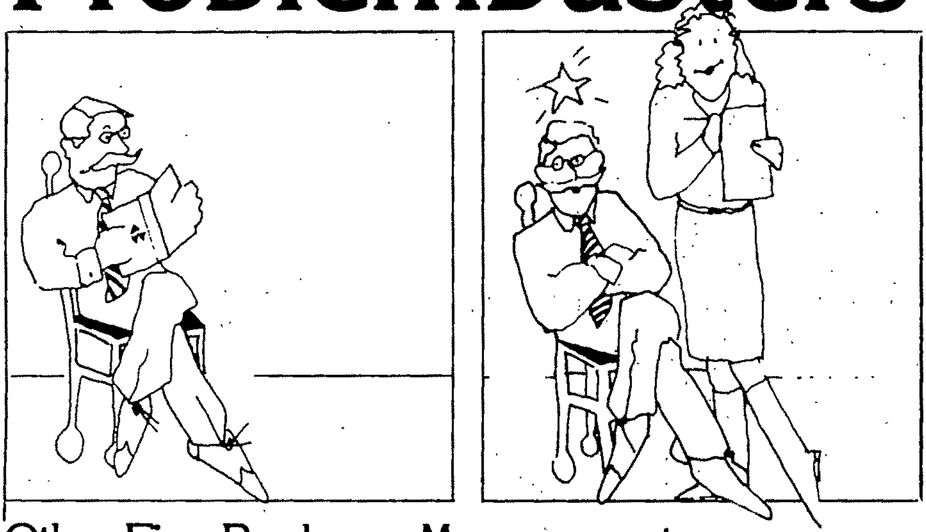

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